

# A STUDY OF THE NEW ZEALAND CHIRONOMIDAE (DIPTERA, NEMATOCERA)

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THE first two species of New Zealand Chironomidae were described by Hudson in *An Elementary Manual of New Zealand Entomology* (1892), one species being placed in *Chironomus* and the other in *Corethra*. Hutton added another eleven in 1902 and since then Kieffer (1922), Tonnoir (1923) and Pagast (1947) have further increased the total to 19. No attempt has been made to give keys and descriptions for all the known species since Hutton's paper in 1902 (*Trans. New Zealand Inst.* 34 : 180-187).

The basis for the present Study is the collection of almost 700 specimens in the British Museum supplemented by nearly 200 borrowed from the Canterbury Museum, Christchurch. These collections contain about 50 species, but I have actually only described or redescribed 41 species because about eight species of Orthocladiinae and one species of Corynoneurinae are represented either by females or by damaged specimens; this compares favourably with Tonnoir's estimate of 55 species (1923, *Bull. Soc. ent. Belge* 5 : 93). More than one-third of the specimens available to me were collected at Ohakune in the Provincial District of Wellington and the other two-thirds mostly in the Districts of Auckland and Canterbury. Although species of Chironomidae tend to be widely distributed, it is probable that the number of known species could be increased if larger collections were made in other Districts. I am making no pretence that this is in any way a full revision, but it is hoped that it at least includes most of the commoner species and that it may act as an incentive to further collecting and study so that the family may become more fully known.

Of the 19 species that have been described by previous authors, I have examined type material of 13 and have been able to recognize all except two of the remainder. These two are *Chironomus lentus* Hutton and *Dactylocladius commensalis* Tonnoir. The table shows the actual or probable position of all 19 in a more modern classification, which is that used in my "Study of the Chironomidae of Africa South of the Sahara" (see *Bull. Brit. Mus. (nat. Hist.) Entom.* vols. 4-6, 1955-58).

I am indebted to Mr. E. G. Turbott of the Canterbury Museum for lending me type material of Hutton's species and un-named material and to Dr. R. Pilgrim of Canterbury University College for giving me great help with comparisons with Hutton's specimens. I wish also to express my thanks to Dr. W. Hennig of Deutsches Entomologisches Institut for lending me the types of species described by Kieffer and to both Dr. R. G. Ordish and Dr. Dell of the Dominion Museum, Wellington for comparing specimens with the type of *Corethra antarctica* Hudson.

A detailed account of the structures of taxonomic importance is given in Part I of my Study of African Chironomidae referred to above but for convenience I am giving the following notes.

Antennal ratio given as A.R., is the ratio of the greatly elongated last or last two (Tanypodinae) segments of the flagellum to the short basal ones taken together.

The leg ratio, referred to as L.R., is the ratio of the anterior basitarsus to the tibia. The tarsal beard is the row of long hairs seen along part of the anterior tarsus of the males of some species.

The thoracic markings follow a definite pattern throughout the family with the areas of muscle insertion darker than other parts of the cuticle. The most obvious darker areas are the so-called "mesonotal stripes" consisting of a short central (sometimes divided centrally) band in the front half of the mesonotum and two lateral ones in the posterior half.

The wing venation employed uses Tillyard's modification, whereby  $Cu_1$  of earlier authors is regarded as  $M_{3+4}$ . The cross-vein m-cu of authors then becomes the true base of this vein and the cubital fork a compound fork which I call the posterior fork.  $Cu_2$  of authors is now  $Cu_1$ .

TABLE.—Previously Known New Zealand Species of Chironomidae

Author and Reference	Original name	Actual or probable position
Hudson, 1892, <i>Manual of New Zealand Entomology</i>	<i>Tanypus antarctica</i>	<i>Anatopynia antarctica</i> .
	<i>Chironomus zealandicus</i>	<i>Chironomus zealandicus</i> .
Hutton, 1902, <i>Trans. New Zealand Inst.</i> 34: 180-187	<i>Chironomus lentus</i>	? <i>Polypedilum</i> .
	<i>C. opimus</i>	<i>Polypedilum opimus</i> .
	<i>C. pavidus</i>	<i>P. pavidus</i> .
	<i>C. ignavus</i>	<i>Polypedilum</i> .
	<i>Orthocladus publicus</i>	<i>Orthocladus</i>
	<i>O. cingulatus</i>	<i>Cricotopus cingulatus</i> .
	<i>Camptocladus vermus</i>	<i>Smittia vermus</i> .
	<i>Tanytarsus vespertinus</i>	<i>Tanytarsus vespertinus</i> .
	<i>Tanypus languidus</i>	<i>Anatopynia languidus</i> .
	<i>T. debilis</i>	<i>A. debilis</i> .
<i>T. malus</i>	<i>Pentaneura (Ablabesmyia) malus</i> .	
Kieffer, 1922, <i>Ann. Soc. Linn. Lyon.</i> 68: 145-148	<i>Chironomus novae-zelandiae</i>	<i>Chironomus zealandicus</i> .
	<i>Macropelopia hudsoni</i>	<i>Anatopynia antarctica</i> .
	<i>M. novae-zelandiae</i>	<i>A. debilis</i> .
Tonnoir, 1923, <i>Ann. Biol. Lacust.</i> 11: 284	<i>Dactylocladius commensalis</i>	<i>Orthocladus</i> .
Pagast, 1947, <i>Arch Hydrobiol.</i> 41: 446-448	<i>Lobodiamesa campbelli</i>	<i>Lobodiamesa campbelli</i> .
	<i>Maoridiamesa harrisi</i>	<i>Maoridiamesa harrisi</i> .

#### AFFINIITES OF THE NEW ZEALAND CHIRONOMIDAE

Although the present paper cannot be considered in any way a complete revision of the New Zealand species, there are representatives of more than 20 genera and thus some idea can be obtained of the affinities of the Chironomid fauna as a whole.

At the subfamily level, the Clunioninae are quite unrepresented but examples may well be found later ; there is a single specimen, too damaged for description, belonging to the Corynoneurinae, genus *Corynoneura*, in the material at my disposal. All the other subfamilies are present, there being 12 species of Tanypodinae, one of Podonominae, two of Diamesinae, about 17 of Orthocladiinae (only nine described), and 17 of Chironominae. This is a very similar distribution of species for each subfamily to that for the British fauna, differing mainly, apart from the absence of the Clunioninae, in the higher number of species of Tanypodinae in proportion to the species of Orthocladiinae and Chironominae.

The genera *Lobodiamesa*, *Maoridiamesa*, *Ophryophorus* and *Paucispinigera* are peculiar to New Zealand and representatives are not known from any other part of the world. It will be interesting to see whether any of them are eventually found in Patagonia. The new genus *Harrisius* is represented in the British Museum by a second, as yet undescribed, species from New Guinea. The Patagonian genus *Rhinocladius* Edwards has no New Zealand species known to me.

The single species of *Riethia* shows a great similarity in general and hypopygial structure to a species from Patagonia and South Chile placed by Edwards in *Pseudochironomus*. As explained below, I have transferred them both to *Riethia*, a genus including Australian species. *Diplocladius lacuniferus* shows considerable resemblance to Patagonian species (placed by Edwards in the genus *Stictocladius*), but *D. pictus* equally shows affinities with Palaearctic and possibly African species. These are the only outstanding examples that I have been able to find in the Chironomidae of close similarity between the New Zealand and southern South American faunas, as they are known at present, although there is resemblance shown by a species of *Anatopynia* (see below).

All the other species belong to well-known genera with world-wide distribution, many including abundant species in other Regions. These genera are *Pentaneura*, *Anatopynia*, *Podonomus*, *Metriocnemus*, *Cricotopus*, *Trichocladius*, *Chaetocladius*, *Orthocladius*, *Smittia*, *Chironomus*, *Polypedilum* and *Tanytarsus*. An interesting feature, probably associated with the isolated position of New Zealand is the paucity of species, but further collecting is certain to increase the length of the list considerably.

Of these genera, the only ones with more than four species are *Anatopynia* (ten species) and *Polypedilum* (seven species). *Anatopynia*, although of world-wide distribution is a genus that seems to be especially associated with the cooler water found in the more temperate latitudes and in mountainous areas. There are similarly about ten species known from Patagonia and South Chile, one of which, *A. apicina* Edwards, is extremely similar to the New Zealand species *A. apicinella* sp. n. Apart from this one species, the remainder seem to resemble the Palaearctic species as much as they resemble those from Patagonia. The resemblance is heightened by the presence of two species of Edwards' Group C (see below), a group previously known only from the Holarctic Region and absent from Patagonia. The species of *Polypedilum* are fairly heterogeneous. Whilst some, such as *P. pavidus* are quite typical of the genus, *P. opimus* although certainly belonging to *Polypedilum* has a somewhat unusual wing venation and trichiatio. *Polypedilum* is probably

more typical of the warmer latitudes; only two species were found by Edwards in southern South America and they show no particular resemblance to the New Zealand species. One New Zealand species, *P. longicrus*, is of interest because it has previously been recorded only from Africa south of the Sahara and may possibly have been introduced to New Zealand.

Of the remaining species, some (e.g. *Podonomus ohakunensis*, *Metriocnemus lobifer* and *Cricotopus zealandicus*) are most closely allied to Palaearctic species, whilst *Trichocladius pluriserialis* is closest to an African species. *Orthocladius pictipennis* is unusual in possessing patterned wings but does not seem to be at all closely allied to any of the Patagonian Orthoclaudiinae similarly adorned.

In conclusion it may be said that the Chironomid fauna of New Zealand, as known at present, includes scattered species mostly from the larger genera of the family; there are also four genera known only from New Zealand. The genera present and the number of species from each subfamily agree with the normal fauna of a temperate region. The relationships of the species are varied, probably the greater number of species show similarities to Palaearctic species, but *Anatopynia apicinella*, *Diplocladius lacuniferus* and *Riethia zeylandica* show distinct Patagonian affinities. None of the peculiar New Zealand genera has yet been found in Patagonia, nor has the Patagonian genus *Rhinocladius* been found to occur in New Zealand.

## KEY TO SUBFAMILIES OF CHIRONOMIDAE

- |   |                |
|---|----------------|
| 1. True base of $M_{3+4}$ present (m-cu of authors)   | 2              |
| Base of $M_{3+4}$ absent  | 4              |
| 2. Postnotum lacking median furrow; $R_{2+3}$ completely absent, although radial veins well separated   | PODONOMINAE    |
| This furrow and $R_{2+3}$ present, or else radial veins very close  | 3              |
| 3. $R_{2+3}$ forked (in some small species of <i>Pentaneura</i> it may be crowded out, but then wings very hairy)   | TANYPODINAE    |
| $R_{2+3}$ simple and distinct, wings usually bare   | DIAMESINAE     |
| 4. Ratio of anterior basitarsus to tibia ("leg ratio" or "L.R.") less than 1; anterior tibia with spur, tibial combs not composed of short, basally-fused spinules; male styles folded inwards                          | 5              |
| L.R. nearly always more than 1; front tibial spur reduced except in <i>Riethia</i> and <i>Pseudochironomus</i> ; tibial combs composed of short, basally fused spinules; male styles always directed rigidly backwards. | CHIRONOMINAE   |
| 5. $R_{4+5}$ completely fused with the thickened costa to form a "clavus" and with a false vein running close to anterior margin on outer half of wing  | CORYNONEURINAE |
| Wing veins not like this  | 6              |
| 6. Pronotum scarcely divided; anepisternum with a well-formed horizontal suture; male antennae normally plumose   | ORTHOCLADIINAE |
| Pronotal lobes widely separated; anepisternal suture obsolete; male antenna not plumose   | CLUNIONINAE    |

## SUBFAMILY TANYPODINAE

Base of  $M_{3+4}$  present (m-cu of Edwards and other authors), vein  $R_2$  present as a fork at the end of  $R_{2+3}$ , though occasionally in some small species of *Pentaneura* the whole of vein  $R_{2+3}$  may be crowded out by the close approximation of  $R_1$  and

R<sub>4+5</sub>. Male antenna with 15 segments, the fifteenth being formed at the apex of the elongated fourteenth; female antenna with 11–15 segments. Male hypopygium with styles folding inwards and each carrying a distinct spine at the apex or near it, coxites usually lacking inner lobes or appendages.

*Anatopynia* is the dominant genus of the subfamily in the New Zealand fauna, eight species being known to me. Apart from this genus, the only other representatives of the group so far known are two species of *Pentaneura*.

#### KEY TO NEW ZEALAND GENERA OF TANYPODINAE

- Female antenna with 11–13 segments, costa not produced . . . . . *Pentaneura* Philippi  
 Female antenna with 15 segments, costa distinctly produced beyond apex of R<sub>4+5</sub>  
 . . . . . *Anatopynia* Johannsen

#### Genus *PENTANEURA* Philippi

*Pentaneura* Philippi, 1865, *Verh. Zool.-bot. Ges. Wien* 15 : 629; Edwards, 1929, *Trans. ent. Soc. Lond.* 77 : 287; Johannsen, 1946, *Journ. New York ent. Soc.* 54 : 267–289; Freeman, 1955, *Bull. Brit. Mus. (nat. Hist.) (Entom.)* 4 : 20.

*Isoplastus* Skuse, 1889, *Proc. Linn. Soc. N. S. Wales* (2) 4 : 279 (nec *Isoplastus* Horn, 1880, *Trans. Amer. ent. Soc.* 8 : 277—Coleoptera).

*Ablabesmyia* Johannsen, 1905, *Bull. N. Y. State Mus.* 86 : 135.

*Tanypus* (Meigen) Hutton, 1901, *Trans. New Zealand Inst.* 34 : 186 (in part).

Wings densely hairy and often with a pattern of dark macrotrichia with or without staining on the membrane; costa not produced, R<sub>2</sub> normally present, base of M<sub>3+4</sub> placed immediately beyond the posterior fork. Antenna of female with 11–13 segments. Pronotum more reduced than in other genera of the subfamily. No tarsal spurs, pulvilli usually absent.

In my study of the African species (1955) I recognized two subgenera, *Pentaneura* and *Ablabesmyia*. Fittkau (1957, *Arch. Hydrobiol.* 53 : 313–322) does not seem to accept this division but he has erected two distinct genera for the species groups of my subgenus *Pentaneura* that show hypopygial differences between the species. He has named these two genera *Thienemannimyia* and *Conchapelopia*. The main differences between the genera recognized by him appear to be in the male hypopygium but he gives as additional characters the spur shape which is very difficult to see and appreciate and the presence in *Conchapelopia* of tiny mesonotal protuberances. However, this latter character is also present in some species of *Pentaneura sensu stricto* such as *P. (P.) rutshuruiensis* Goetghebuer and *teesdalei* Freeman (both from Africa south of the Sahara), a fact which tends to invalidate the definition. I still prefer to adhere to the classification which I adopted in 1955.

#### KEY TO NEW ZEALAND SUBGENERA AND SPECIES OF *Pentaneura*

Tibiae without black rings, wings unmarked in the single New Zealand species, prescutellar area not well marked, acrostichal bristles running right across it

. . . . . *Pentaneura s. str.* only one species—*harrisi* sp. n.

Tibiae with three well-defined black rings, wings with pattern of patches of dark macrotrichia, prescutellar area sharply defined, more or less circular and with acrostichal bristles diverging around it

. . . . . *Ablabesmyia* Johannsen, only one species—*malus* Hutton

*Pentaneura (Pentaneura) harrisi* sp. n.

Yellowish, mesonotal stripes brownish and separate, abdominal segments with brown bands in the basal halves, wings and legs unmarked. This species is closely allied to the European species *brevitibialis* Goetghebuer but it differs slightly in colour and I have preferred to treat it as separate.

*Male.* Wing length 2 mm.

*Head* and mouthparts brownish, antennal pedicel dark brown, A.R. 1.2. *Thorax* with yellowish, pruinose background, mesonotal stripes pale brown, central pair clearly separated longitudinally, bristles brown, postnotum and sternopleuron brown. *Legs* yellowish and unmarked, anterior tarsi without beard, pulvilli absent, L.R. 0.8, middle leg ratio practically 1. *Wings* evenly and densely clothed with macrotrichia,  $R_{2+3}$  just visible,  $R_{4+5}$  ending beyond tip of  $M_{3+4}$ , anal angle rounded, halteres yellow. *Abdomen* yellowish, segments 2-5 with brown bands in basal halves but not placed at the bases, segments 6-9 brown. Hypopygium with straight and simple styles.

*Female* similar to male, but thorax and abdomen less clearly marked in some specimens.

Holotype male, WELLINGTON: Ohakune, xii.1922-i.1923 (*T. R. Harris*); further material, Ohakune, 4 ♀, x-xi.1922 and x-xi.1923 (*T. R. Harris*), holotype and others all in the British Museum. CANTERBURY: Hilltop, 1 ♂, 1 ♀, i.1925 (*A. Tonnoir*) in the Canterbury Museum.

*Pentaneura (Ablabesmyia) malus* Hutton

*Tanypus malus* Hutton, 1902, *Trans. New Zealand Inst.* 34: 187.

Dark brown, abdomen of male whitish on basal half, legs pale with dark rings on tibiae and tarsal segments and at apex of femur, wings mottled. Very similar to the Palearctic species *P. monilis* Linn. from which it differs in the rather more numerous and smaller wing spots.

*Male.* Wing length 3 mm.

*Head*, mouthparts and antennae brown, A.R. 1.5. *Thorax* dark brown with pruinose mottling. *Legs* yellow, femora darker basally and with an apical black band, tibiae with black bands at the base, centre and apex, all tarsal segments dark at apices, basitarsus with additional central band, L.R. 0.75. *Wings* with blackish spots at apices of  $R_1$ ,  $R_{2+3}$ ,  $R_{4+5}$ , on r-m cross-vein, in extreme base of posterior fork and at apex of  $Cu_1$ ; cell  $R_5$  with a large central grey spot and three smaller ones in outer half, cell  $M_2$  with two spots, two further grey spots at apex and centre of vein  $M_{3+4}$ , three spots in anal cell. Halteres yellow. *Abdomen* with segments 1-5 whitish and with indistinct dark markings at their bases; remainder of abdomen dark.

*Female* resembles male.

I have seen cotypes of this species both in the British Museum and from the Canterbury Museum.

DISTRIBUTION. CANTERBURY: Christchurch, 6 ♂, 9 ♀, cotypes and 1 ♂, 5 ♀, ix-xii.1924 (*A. Tonnoir*). WESTLAND: Lake Moana, 1 ♂, xii.1925 (*A. Tonnoir*).

WELLINGTON: Ohakune, 1 ♀ (*T. R. Harris*). AUCKLAND: Paiaka, 3 ♀ (*R. A. Cumber*).

Genus *ANATOPYNIA* Johannsen

*Anatopynia* Johannsen, 1905, *Bull. N. Y. State Mus.* 86: 135; Edwards, 1929, *Trans. ent. Soc. Lond.* 77: 297; Edwards, 1931, *Dipt. Pat. S. Chile*. London, 2: 239; Freeman, 1955, *Bull. Brit. Mus. (nat. Hist.) Entom.* 4: 44.

Wing membrane clothed with macrotrichia; costa strongly produced;  $R_{2+3}$  present and distinct; basal section of  $M_{3+4}$  present and posterior fork just basal to this as in *Pentaneura*; antennae of female 15-segmented; pulvilli present or absent.

*Anatopynia* was first redefined and used in this sense by Edwards (1929). He divided it into three species groups:

*Group A* (*Anatopynia s. str.*). Wings hairy at tips only, wing markings and pulvilli absent.

*Group B* (*Macropelopia* Thienemann). Wings densely hairy and normally with at least a central dark spot, pulvilli absent.

*Group C* (*Psectrotanypus* Kieffer). Wings densely hairy, markings forming bands rather than spots, pulvilli present.

Of the ten New Zealand species that I am recognizing, all except two fall into Group B; these two, *A. quadricincta* and *cana* fall into Group C, whilst Group A is not represented. Species of all groups are known from the Palaearctic Region; Group B has been recorded from the Nearctic Region and there is a specimen of a species of Group C from Texas in the British Museum, so that both Groups B and C are known from the Holarctic Region. Only two other parts of the world have been treated fully in respect of this genus, namely South Chile and Argentina and Africa south of the Sahara. In the former there are ten species of Group B known (Edwards, 1931), whilst in Africa there are two typical species of Group B, one from the Cape and the other from Ruanda Urundi and Uganda, and two less typical, one having a wide distribution (Freeman, 1955). In addition there are undescribed species of Group B in the British Museum from Tibet, Kashmir, Punjab, W. Himalayas, Assam and Queensland.

Taking the ten New Zealand species into account, it seems that the genus is to be found with its greatest development in the cooler and more temperate parts of the world and that where species are found in tropical or subtropical regions they are often associated with mountainous districts.

The New Zealand species described here show a general resemblance to the Palaearctic species which is accentuated by the presence of two species belonging to Group C, a group which has not previously been recorded outside the Holarctic Region. There is also a resemblance to the South Chilean and Argentinian species shown particularly by *A. apicinella* which is very similar to *A. apicina* from Chile and Argentina.

KEY TO NEW ZEALAND SPECIES OF *Anatopynia*

- |  |   |
|--|---|
| 1. Dark markings when present on femora, confined to apex or subapical ring, pulvilli absent . . . . . | 2 |
| Femora with a central as well as one or two subapical dark rings, small pulvilli present               | 9 |



Dr. R. G. Ordish and Dr. Dell; type locality "New Zealand". I have seen the type female of *Macropelopia hudsoni* which is in the Deutsches Entomologisches Institut, Berlin; type locality, Wellington.

DISTRIBUTION. AUCKLAND: Mount Albert, 2 ♂, 4 ♀, xii.1916 (*A. E. Brookes*); Tamaki, 2 ♀, viii.1917 (*A. E. Brookes*); Titirangi, 1 ♂, 2 ♀, xii.1915 (*A. E. Brookes*); Pokapu, 1 ♂, i.1919 (*J. Muggeridge*); Paiaka, 9 ♀, xi-xii.1949 (*R. A. Cumber*). WELLINGTON: Ohakune, 1 ♂, 10 ♀ (*T. R. Harris*) and 1 ♂, ii.1925 (*A. Tonnoir*). WESTLAND: no locality, 3 ♀, ii.1923 (*T. R. Harris*). CANTERBURY: Governor's Bay, 1 ♀, xi.1922 (*J. F. Tapley*); Christchurch, 1 ♂, 2 ♀, xi-xii.1924 (*A. Tonnoir*); Cass, 3 ♂, 1 ♀, ii.1925 (*A. Tonnoir*); Kennedy's Bush, 1 ♂, 1 ♀, i.1925 (*A. Tonnoir*); Hilltop, 1 ♀, i.1925 (*A. Tonnoir*); S. Canterbury, 1 ♂, 11 ♀, ii.1923 (*T. R. Harris*). OTAGO: Queenstown, 1 ♀, iii.1924 (*L. Curtis*).

### *Anatopynia apicincta* sp. n.

Thorax yellow with reddish stripes, abdomen yellow, segments with broad dark bands at apices; outer half of wing covered with dark macrotrichia with oval areas of pale ones, wing yellowish basal to cross-vein; femora dark at tips only. Easily separated from other species by the abdominal and wing patterns.

*Male*. Wing length 3.3-3.5 mm.

*Head* yellow, mouthparts and antennae brown, A.R. 1-1.5. *Thorax* with yellow background, stripes reddish, lateral ones with a dark spot posteriorly; sternopleuron and postnotum brown, scutellum with a brown spot, postnotum with a group of six to ten hairs. *Legs* yellow; knees, apices of tibiae and of tarsal segments dark brown; pulvilli absent, L.R. 0.7. *Wings* (Pl. XI, fig. b) with dark macrotrichia distal to cross-veins and in distal half of anal cell; this area of dark macrotrichia including pale areas as shown; halteres yellow. *Abdomen* yellow, segments 2-8 each with a broad dark band apically.

*Female* similar to male.

Holotype male and 15 ♂, 4 ♀, OTAGO: Alexandra (*C. C. Fenwick*). Other specimens: WELLINGTON: Ohakune, 1 ♂, 2 ♀ (*T. R. Harris*). WESTLAND: Otira, 1 ♀ (*J. W. Campbell*). CANTERBURY: White Rock, 1 ♀ (*J. W. Campbell*); Grey Mount, 1 ♀ (*J. W. Campbell*); Cass, 1 ♂, 1 ♀, ii.1925 (*A. Tonnoir*); Akaroa, 1 ♀, xii.1924 (*A. Tonnoir*). OTAGO: Queenstown, 2 ♀ (*C. C. Fenwick*); Ben Lomond, 1 ♂, 1 ♀ (*T. R. Harris*). Specimens collected by A. Tonnoir are in the Canterbury Museum, all others and holotype are in the British Museum.

### *Anatopynia languidus* Hutton

*Tanypus languidus* Hutton, 1902, *Trans. New Zealand Inst.* 34: 186.

Superficially not unlike *apicincta* but easily distinguished by the main dark abdominal band being placed basally on each segment and by the more extensive pale areas on the wings. It is quite similar to *debilis* but the anal cell has two discrete spots and there is a darkening only at base and apex of  $M_{3+4}$  and not along the stem.

*Male*. Wing length 3.5 mm.

*Head* brownish, mouthparts and antennae darker, A.R. about 1.8. *Thorax* yellowish, stripes reddish, postnotum and sternopleuron brown, postnotum with group of six to ten hairs. *Legs* yellow; knees, apices of tibiae and of tarsal segments obscurely brown; pulvilli absent, L.R. about 0.7. *Wings* pale and with dark patches of macrotrichia as shown in Pl. XI, fig. *c*; anal cell with two separate spots, vein  $M_{3+4}$  dark only at the base and apex. *Abdomen* yellow, segments 2-7 with a brown band basally, sometimes obscurely dark along the mid-line or with an extra rounded spot each side in the apical half of each segment.

*Female* similar to male, wing markings more intense as usual.

I have seen cotypes both in the British Museum and from the Canterbury Museum.

DISTRIBUTION. AUCKLAND: Paiaka, 1 ♀ (*R. A. Cumber*). WELLINGTON: Ohakune, 8 ♂, 5 ♀ (*T. R. Harris*). WESTLAND: Lake Moana, 3 ♂, 4 ♀, xii.1925 (*A. Tonnoir*). CANTERBURY: Christchurch, 1 ♂, 4 ♀, cotypes; Cass, 3 ♂, ii.1925 (*A. Tonnoir*). OTAGO: Queenstown, 1 ♂ (*L. Curtis*); Alexandra, 4 ♂, 2 ♀ (*C. C. Fenwick*).

### *Anatopynia debilis* Hutton

*Tanypus debilis* Hutton, 1902, *Trans. New Zealand Inst.* 34: 186.

*Macropelopia novae-zelandiae* Kieffer, 1921, *Ann. Soc. Linn. Lyon.* 58: 147 (*syn. nov.*).

Superficially this species is very similar to *languidus* but it differs in the wing markings and in the pruinose thorax which is paler and which tends to have a cross-banded appearance. I have seen the holotype of *novae-zelandiae* and can confirm the synonymy.

*Male*. Wing length 3.5 mm.

*Head* and antennae yellowish, mouthparts brown, A.R. about 1.6. *Thorax* with yellowish white pruinose background; stripes reddish yellow, postnotum and sternopleuron browner; median mesonotal stripe darker posteriorly and lateral stripes darker anteriorly giving thorax a cross-banded appearance; all thoracic hairs pale, postnotum with a group of six to ten hairs. *Legs* yellowish white, darkened narrowly immediately above and below the knees and at apices of tibiae and of tarsal segments, pulvilli absent, L.R. 0.7. *Wings* (Pl. XI, fig. *d*) with more extensive dark haired areas than *languidus*, anal cell with one large dark spot which leaves base and apex clear,  $M_{3+4}$  dark for most of its length. *Abdomen* yellow, segments 2-6 each with an obscure brown band at about the centre, each band darker centrally and laterally.

*Female* resembles male, abdominal markings virtually absent.

I have seen cotypes of *debilis* from the Canterbury Museum (type locality, Christchurch) and the holotype of *novae-zelandiae* which is in the Deutsches Entomologisches Institut, Berlin (type locality "New Zealand").

DISTRIBUTION. AUCKLAND: Waitomo Caves, 1 ♀ (*C. L. Edwards*). WELLINGTON: Ohakune, 5 ♂, 7 ♀ (*T. R. Harris*). WESTLAND: Lake Moana, 1 ♂, xii.1925 (*A. Tonnoir*). CANTERBURY: White Rock, 3 ♂ (*J. W. Campbell*); Christchurch, 1 ♂, 2 ♀ cotypes of *debilis*, 1 ♂ (*J. W. Campbell*) and 2 ♂, 1 ♀, ix-x.1924 (*A. Tonnoir*); Dean's Bush, 2 ♂, x.1924 (*A. Tonnoir*).

*Anatopynia quinquepunctata* sp. n.

A rather small species, readily recognized by the wing pattern of five dark spots, one being in anal cell and two others at apices of  $M_{3+4}$  and  $Cu_1$ .

*Male.* Wing length 2.5 mm.

*Head* yellowish, mouthparts and antennae brown, A.R. about 1. *Thorax* reddish brown and shining, shoulders and anterior parts of pleura yellow; postnotum with group of hairs at apex. *Legs* yellow, knees rather broadly dark, apices of tibiae and of tarsal segments brown, pulvilli absent, L.R. about 0.6. *Wings* (Text-fig. 1, a of female) with five dark spots formed of dark macrotrichia on slightly stained patches, a single one in anal cell and rounded ones at apices of  $M_{3+4}$  and  $Cu_1$ , extreme apex of wing pale. *Abdomen* yellow, segments 3-5 with narrow sub-basal dark bands, 6-7 more generally darkened.

*Female* similar to male in general but wings more distinctly patterned and abdomen more uniformly banded.

Holotype male and 2 ♀, CANTERBURY: Cass, xi. 1924 (*A. Tonnoir*); holotype returned to the Canterbury Museum, one female in the British Museum.

*Anatopynia flavipes* sp. n.

A small brownish species, thorax pruinose, tarsal segments not dark at apices, wing pattern fainter than in some other species, pale areas tending to form three cross-bands.

*Male.* Wing length 2 mm.

*Head*, mouthparts and antennae pale brown, A.R. about 1.4. *Thorax* fairly uniformly brown, mesonotum pruinose, postnotum with a group of hairs at apex. *Legs* yellow, tibiae slightly darker at tips, tarsi undarkened even at tips of segments, pulvilli absent, L.R. 0.7. *Wings* (Text-fig. 1, b of female) greyish white with pale

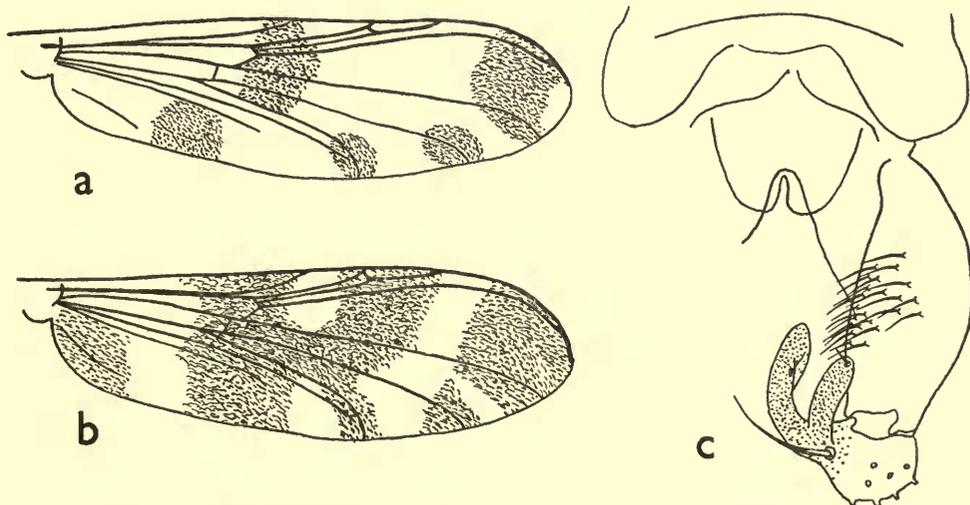


FIG. 1. *Anatopynia* and *Podonomus*. (a) Wing of *A. quinquepunctata*; (b) wing of *A. flavipes*; (c) hypopygium of *P. ohakunensis*.

areas as shown, the effect being of three pale cross-bands ; halteres pale. *Abdomen* brown, not distinctly banded.

*Female* similar to male, wing markings a little more distinct.

Holotype male and 1 ♀, WESTLAND : Lake Moana, xii.1925 (*A. Tonnoir*) ; holotype returned to the Canterbury Museum.

### *Anatopynia apicinella* sp. n.

Mesonotum reddish, femora practically unmarked, wings with a more or less distinct median dark transverse band and sometimes a slightly darkened apex ; abdomen of male pale and with dark central or basal bands on segments 3-7 or 2-7. At first glance this species might be placed in *Pentaneura*, but the produced costa and 15-segmented female antennae show that *Anatopynia* is the correct genus. It is very similar to *A. apicina* Edwards from South Chile and Argentina but it differs in the more basal placing of the dark bands on the abdominal segments, by the pale knees and feebler wing markings. It is also not unlike *A. nuxax* Walker from the Palaearctic Region.

*Male*. Wing length 3-3.5 mm.

*Head*, antennae and mouthparts yellowish, A.R. 1.5. *Thorax* with shining reddish scutum ; postnotum and sternopleuron brown, postnotum with group of six to eight hairs. *Legs* yellow, knees practically unmarked, apices of tibiae and of tarsal segments darkened ; pulvilli absent, L.R. 0.6. *Wings* with cross-veins darkened and with a median band of dark macrotrichia mainly distal to cross-veins but extended in anal cell, apical quarter of wing may also be vaguely darkened ; wing markings variable in intensity, often very faint ; halteres yellow. *Abdomen* yellowish white, segments 1 and 2 usually plain, 3-5 with a dark band in basal half, 6-7 brown, but segment 2 may possess a dark band in some specimens and there may be a faint central darkening along most of abdomen.

*Female* with thorax, leg and wing pattern similar to male, abdomen more or less unmarked, reddish.

Holotype male and 29 ♂, 21 ♀, WELLINGTON : Ohakune (*T. R. Harris*) all in the British Museum. Further specimens in the Canterbury Museum : WESTLAND : Lake Moana, 2 ♂, 2 ♀, xii.1925 (*A. Tonnoir*). CANTERBURY : Cass, 2 ♂, 1 ♀, xi.1924-ii.1925 (*A. Tonnoir*).

### *Anatopynia umbrosa* sp. n.

Mesonotum whitish yellow with reddish brown stripes ; legs usually darkened at the knees ; wings with a central and apical band much as in *apicinella* though much more pronounced, especially in the female, differing by the presence of a patch of black hair in the centre of cell R<sub>5</sub> ; abdominal pattern formed of transverse row of dark spots on each segment ; female very bulky and the whole insect is much larger than *apicinella*.

*Male*. Wing length 4.5 mm.

*Head*, mouthparts and antennal pedicel brown, flagellum missing. *Thorax* with

whitish yellow background, mesonotal stripes reddish brown with browner markings especially centrally and posteriorly, sternopleuron and postnotum dark brown, the latter with hair patch. *Legs* yellowish brown and with a brown ring above and below each knee, apices of the tibiae and of tarsal segments brown, pulvilli absent, L.R. 0-6. *Wings* much less well marked than in the female (Pl. XI, fig. *e*), cross-veins brown clouded, apex faintly clouded and with indications of dark hair patches one below apex of  $R_3$  in cell  $R_5$  and one in anal cell; halteres yellow. *Abdomen* yellow, segments 2-7 each with a transverse row of three spots placed at the middle of the segment; the central spots are blacker, nearly circular and carry tufts of black hair; the lateral spots are brown, oval, without conspicuous hair tufts and reach to the lateral margins; segment 8 and hypopygium brown.

*Female* resembles male in colour of head, thorax, legs and abdomen, although abdominal spots less conspicuous; wings much more strongly marked, as in the figure. Cross-veins with a strong brown stain, widening anteriorly and extending along costa as a yellow stain, also widening but much fainter in anal cell where it includes a dark hair patch. Apical third of wing also brown stained and including a dark hair patch in the centre of cell  $R_5$  and another in cell  $M_2$ ; wing also stained at the base.

Holotype female and another female, WELLINGTON: Ohakune (*T. R. Harris*). OTAGO: Queenstown, 2 ♂ (*L. Curtis*); Paradise, 1 ♀ (*C. C. Fenwick*). CANTERBURY: Upper Hororata, 1 ♀, i. 1922 (*G. Archey*). The last specimen is in the Canterbury Museum, holotype and remainder in the British Museum.

### *Anatopynia quadricincta* sp. n.

Mesonotum yellowish with reddish stripes, pruinose only between the stripes, patch of hair above wing base black, as usual; femora with basal, central and two subapical dark bands; wings with heavy pattern, more or less as two bands, apex of anal cell with clear area, wing apex with row of four dark-haired areas more or less set in pale areas, pale area basal to r-m cross-vein comparatively small; abdomen with pattern of transverse rows of three spots, central one with tufts of black hairs.

This species and the next one differ from the other New Zealand species by the presence of an extra dark band on the femora and the possession of small pulvilli; the wing pattern also tends to be more in the form of bands. They resemble *umbrosa* in the arrangement of the dark spots on the abdomen, but are obviously more allied to the European species *varia* Fabricius and *trifascipennis* Zetterstedt. The two species are easily separated by the thoracic pruinosity and details of leg and wing pattern, as well as by the darker colour of *quadricincta*.

*Male*. Wing length 3.5-4.5 mm.

*Head* yellowish brown, mouthparts and antennae darker, A.R. 1-6. *Thorax* yellow, stripes reddish, darker posteriorly, mesonotum pruinose between the stripes and in prescutellar area, sternopleuron and postnotum dark brown, the latter with hair patch; hair patch immediately anterior to wing base black. *Legs* yellowish, femora with basal, central and two subapical brown bands, tibiae with sub-basal and apical brown bands, apices of tarsal segments brown; L.R. 1-6, small pulvilli

present. *Wings* (Pl. XI, fig. *f* of female) with two main dark bands and an apical dark area; the diagnostic features are the more or less ocellated spots in the outer half of the wing, the presence of a pale area at the apex of the anal cell in addition to the one just basal to this and the small size of the pale spot immediately basal to r-m. Halteres yellow. *Abdomen* yellow, segments 2-7 each with a transverse row of spots, the central ones blacker and with tufts of black hair, lateral ones brown and oval.

*Female* very similar to male.

Holotype male and 6 ♂, 18 ♀, WELLINGTON: Ohakune (*T. R. Harris*). AUCKLAND: Hunua Ranges, 1 ♂ (*A. E. Brookes*). WESTLAND: Lake Moana, xii.1925 (*A. Tonnoir*). CANTERBURY: Christchurch, R. Purau, 1 ♂, 1 ♀ (*J. W. Campbell*); Christchurch, 1 ♀, xii.1924 (*A. Tonnoir*). Specimens collected by Tonnoir are in the Canterbury Museum, holotype and remainder are in the British Museum.

### *Anatopynia cana* sp. n.

Resembles *quadricincta* but paler, mesonotum with whitish pruinosity all over, hair patch anterior to wing base pale; femora with only central and single subapical brown bands; wing without the second pale area at the apex of the anal cell and apical markings more indefinite.

*Male*. Wing length 3.5 mm.

*Head* yellow and pruinose, antennae brown, A.R. about 1.8. *Thorax* pale reddish yellow, pro- and mesothorax covered with whitish pruinosity, mesonotal stripes visible because of changing appearance of pruinosity with changes in light direction; hair patch anterior to wing base pale; postnotum and sternopleuron reddish and less pruinose, postnotum with hair patch. *Legs* yellowish white, femora pale at base but with central and single subapical brown rings, tibiae with brown sub-basal ring, apices of tibial and tarsal segments brown; L.R. 1.6, small pulvilli present. *Wings* not unlike *quadricincta* in pattern, but apex much paler and lacking any definite spots, apex of anal cell dark, pale spot basal to cross-vein larger. Halteres yellow. *Abdomen* whitish and with basic pattern similar to *quadricincta* but with spots all brown and much less distinct.

*Female* similar to male, abdominal spots rather darker.

Holotype male and 2 ♂, 5 ♀, WELLINGTON: Ohakune (*T. R. Harris*), all in the British Museum.

### SUBFAMILY PODONOMINAE

The Podonominae differ from the Tanypodinae because (1) although the base of  $M_{3+4}$  is present,  $R_{2+3}$  is completely absent even though the two radial veins are well separated; (2) the postnotum is short and rounded and has no trace of a median furrow; and (3) at rest the wings are superposed over the back as in the Ceratopogonidae. The subfamily is represented in the material available to me by a single species of *Podonomus* allied to, and possibly a form of, *P. kiefferi* Garrett (*peregrinus* Edwards).

Genus *PODONOMUS* Philippi

*Podonomus* Philippi, 1865, *Verh. Zool.-bot. Ges. Wien* 15 : 691 ; Edwards, 1931, *Dipt. Pat. S. Chile*. London, 2 : 252 ; Edwards, 1937, *Int. Rev. Hydrobiol.* 35 : 100 ; Wirth, 1952, *Rev. Chil. Ent.* 2 : 93.

The following definition is taken from Edwards (1931) : eyes reniform, antennae of male more or less plumose, with 15 segments, penultimate segment longer than last ; antennae of female with 10-14 segments. Pronotum reduced and not visible from above, postnotum small and rounded and lacking furrow. Wings with  $R_1$  simple in male but swollen apically in female, costa produced, true base of  $M_{3+4}$  a little beyond posterior fork, squama with long fringe.

*Podonomus ohakunensis* sp. n.

Uniformly brown, A.R. 0.75, female antennae with 12 segments, mesonotum with long yellow hairs on anterior part, wings densely hairy, male hypopygium with forked styles, the two branches more or less equal. This species is extremely similar to *P. kiefferi* Garrett, from which it may be distinguished by the two branches of the male styles being practically equal. It may prove to be the New Zealand form of this widespread species.

*Male*. Wing length 2 mm.

*Head*, mouthparts and antennae dark brown, eyes bare, A.R. 0.75. *Thorax* dark brown, slightly pruinose and with long yellow hair on the anterior part especially on the shoulders, dorso-central bristles irregularly triserial. *Legs* brown, L.R. 0.6, pulvilli absent, fourth tarsal segment shorter than the fifth, no tarsal segments swollen, spurs of middle tibiae as in *kiefferi*, i.e. rather short and thin and not very unequal. *Wings* densely hairy, similar to *kiefferi*, halteres brown. *Abdomen* dark brown with long yellow hair ; hypopygium (Text-fig. 1, c) with the two branches of the styles subequal and both rounded at the apex (in *kiefferi* one is longer and more or less pointed).

*Female* similar to male in general colour, structure and hairiness, wings with  $R_1$  swollen, antennae with 12 segments.

Holotype male and 46 ♀, WELLINGTON : Ohakune, v-vii.1923 also 1 ♂, 2 ♀, x-xi.1922 (*T. R. Harris*). WESTLAND : Lake Moana, 2 ♂, 2 ♀, xii.1925 (*A. Tonnoir*). CANTERBURY : Governor's Bay, 1 ♀, viii.1923 (*J. F. Tapley*). OTAGO : Queenstown, 1 ♂, ix.1923 (*L. Curtis*). Specimens collected by Tonnoir are in the Canterbury Museum, remainder and holotype are in the British Museum.

## SUBFAMILY DIAMESINAE

The Diamesinae occupy a position intermediate between the Tanypodinae and Orthoclaadiinae and may be defined as follows :

Male antennae usually with 13-14 segments, occasionally reduced to as few as six, there are traces of a fifteenth segment in *Protanypus*. Female antennae with six to eight segments except in *Protanypus* where there are 14. Pronotum well developed. Base of  $M_{3+4}$  present,  $R_{2+3}$  present and distinct and ending in costa well beyond  $R_1$

to which it is not connected,  $R_2$  absent. Male hypopygium with infolded styles, coxite often with inner lobes.

Two genera of this subfamily, each with a single included species, are known from New Zealand. Neither genus is recorded from elsewhere and both are quite distinct. There are representatives of both in the British Museum and of one in the Canterbury Museum.

#### KEY TO NEW ZEALAND GENERA AND SPECIES OF DIAMESINAE

- Wing length 2-2.5 mm., pronotum with forwardly projecting lobes, mesonotum densely clothed with short erect hairs except on the stripes, the pits of these hairs giving a rugose appearance to the surface . . . . . *Lobodiamesa campbelli* Pagast  
 Wing length 3.5-4 mm., pronotum large as usual but without forwardly projecting lobes, mesonotum with only the usual three rows of hairs, surface not rugose . . . . . *Maoridiamesa harrisi* Pagast

#### Genus *LOBODIAMESA* Pagast

*Lobodiamesa* Pagast, 1947, *Arch. Hydrobiol.* **41** : 446.

Eyes reniform and pubescent, female antenna with six segments; each half of pronotum with a flat, more or less rectangular, forwardly projecting lobe at the inner edge. Mesonotum densely clothed, except on the stripes, with short erect hairs arising from large pits, which practically touch and give a rugose appearance to the shoulders, prescutellar area, a broad area of the lateral margin and a broad band about five pits wide between lateral and central stripes. Fourth tarsal segment strongly heart-shaped, hardly longer than wide. Wings with neither macrotrichia nor distinguishable microtrichia on the membrane; costa produced,  $R_{2+3}$  running rather close to  $R_{4+5}$ , r-m more or less transverse, base of  $M_{3+4}$  basal to posterior fork.

This is a distinctive and easily recognized genus because of the hairy eyes, pronotal lobes, rugose mesonotum and strongly heart-shaped fourth tarsal segment. Only one species is known which is automatically the type species.

#### *Lobodiamesa campbelli* Pagast

*Lobodiamesa campbelli* Pagast, 1947, *Arch. Hydrobiol.* **41** : 446.

The type series was never returned by Pagast to the British Museum and was apparently destroyed during the Second World War. Fortunately not the entire series had been sent to him and four females remain in the Museum, though these of course are not type material.

It is a small species, wing length 2-2.5 mm., antennae and prothoracic lobes pale in the female, thorax dark brown, stripes blackish, abdomen in female more or less green, sometimes browner dorsally, in male blackish; legs brown, femora paler. The male hypopygium is figured by Pagast.

Type locality NELSON: Blackball.

DISTRIBUTION. WELLINGTON: Ohakune, 4 ♀ (*T. R. Harris*) in the British Museum.

Genus *MAORIDIAMESA* Pagast

*Maoridiamesa* Pagast, 1947, *Arch. Hydrobiol.* 41 : 448.

Eyes rounded above, densely pubescent, female antenna with seven segments. Pronotum large but normal ; mesonotum with the usual rows of hairs only. Fourth tarsal segment of front leg subequal to fifth, bilobed at apex, on other legs shorter than fifth and heart-shaped. Wing membrane with distinguishable microtrichia ; costa produced,  $R_{2+3}$  running mid-way between  $R_1$  and  $R_{4+5}$ , r-m long and curved, base of  $M_{3+4}$  basal to posterior fork.

In wing venation this genus is not unlike *Prodiamesa*, although r-m is longer, but the rounded hairy eyes and heart-shaped fourth tarsal segment preclude its being placed there. In these characters it is closer to *Diamesa*. The genus is only known from New Zealand, where it is represented by a single species which automatically becomes the type of the genus.

*Maoridiamesa harrisi* Pagast

*Maoridiamesa harrisi* Pagast, 1947, *Arch. Hydrobiol.* 41 : 448.

This is a larger species than *Lobodiamesa campbelli*, with wing length 3.5–4 mm. The male is dark, almost blackish but brown on the shoulders and scutellum ; the female thorax is yellowish brown with separate brown stripes. The male hypopygium is figured by Pagast.

As with *Lobodiamesa* the type series was not returned to the British Museum and was probably destroyed during the Second World War. However, 1 ♂ and 7 ♀ taken at the type locality of WELLINGTON : Ohakune (*T. R. Harris*) were retained in the Museum.

DISTRIBUTION. Besides British Museum material from the type locality, there are specimens as follows in the Canterbury Museum : CANTERBURY : Cass, 1 ♀, xii. 1924 (*A. Tonnoir*) ; Hilltop, 1 ♂, 1 ♀, i. 1925 (*A. Tonnoir*).

## SUBFAMILY ORTHOCLADIINAE

True base of  $M_{3+4}$  (m-cu of authors) absent,  $R_{2+3}$  never connected to  $R_1$  by a cross-vein,  $R_{4+5}$  not fused with costa to form a clavus. Eyes typically reniform, seldom with dorsal narrow portion ; male antenna with 14 segments, of female with five to seven. Postnotal furrow distinct, anepisternal suture well developed ; anterior tibia always with a distinct spur, anterior basitarsus always shorter than tibia. Hypopygium not inverted, styles movable and folded inwards in repose.

This subfamily is especially typical of cooler water habitats and is more abundant in the temperate and colder parts of the world. It is not well represented in the New Zealand material at my disposal and there may be considerably more New Zealand species than I have seen. I am not able to describe all the species represented in the collections because several are only present as females and without a figure or description of the male hypopygium and wing the species are not easily recognized again.

I am using the classification given in my " Study of the African Chironomidae,

Part II'' (1956, *Bull. Brit. Mus. (nat. Hist.) Entom.* 4: 287-368). The key given below gives the genera so far known from New Zealand and includes the genus *Limnophyes* because, although I am not describing the species, I wish to place it on record that there is a female of a species of that genus in the British Museum.

## KEY TO NEW ZEALAND GENERA OF SUBFAMILY ORTHOCLADIINAE

- |  |                                   |
|--|-----------------------------------|
| 1. Wing membrane bearing macrotrichia at least at apex . . . . .   | <i>Metriocnemus</i> Wulp          |
| Wing membrane without macrotrichia . . . . .   | 2                                 |
| 2. Eyes densely pubescent . . . . .  | 3                                 |
| Eyes bare . . . . .  | 6                                 |
| 3. Dorso-central hairs minute and decumbent, tibiae often with white rings or completely white, male styles simple . . . . .                             | <i>Cricotopus</i> Wulp            |
| Dorso-central hairs erect and normal . . . . .   | 4                                 |
| 4. Male styles more or less double, wings with dark markings and with distinguishable microtrichia . . . . .   | <i>Diplocladius</i> Kieffer       |
| Male styles simple, wings plain and without microtrichia when examined with a 1/6-in. objective . . . . .  | 5                                 |
| 5. Squama fringed . . . . .  | <i>Trichocladius</i> Kieffer      |
| Squama bare . . . . .  | <i>Smittia</i> Holmgren (in part) |
| 6. Wing membrane with microtrichia distinguishable under a 1/6-in. objective or lesser magnification, membrane colourless by transmitted light . . . . . | 7                                 |
| Wing membrane without distinguishable microtrichia, usually at least slightly brownish by transmitted light . . . . .                                    | 8                                 |
| 7. $Cu_1$ strongly bent near middle, posterior fork well beyond r-m, anal lobe reduced . . . . .   | <i>Limnophyes</i> Eaton           |
| $Cu_1$ not strongly bent, often almost straight, posterior fork only slightly beyond or below r-m; anal lobe present . . . . .                           | <i>Chaetocladus</i> Kieffer       |
| 8. Squama fringed . . . . .  | <i>Orthocladus</i> Wulp           |
| Squama bare . . . . .  | <i>Smittia</i> Holmgren (in part) |

Genus *METRIOCNEMUS* Wulp

*Metriocnemus* van der Wulp, 1874, *Tijdschr. Ent.* 17: 136; Edwards, 1929, *Trans. ent. Soc. Lond.* 77: 310, Freeman, 1956, *Bull. Brit. Mus. (nat. Hist.) Entom.* 4: 294.

Wings with macrotrichia on membrane at least at tip, cross-vein r-m rather short, pulvilli absent, scutum not produced in front, male styles not bifid. There is a single New Zealand species of this world-wide genus in the British Museum and a female of another in the Canterbury Museum; I am not able to describe the latter until a male is available.

*Metriocnemus lobifer* sp. n.

A small brown species falling Group F of Edwards (1929) classification, not unlike the Palearctic species *subnudus* and *brumalis* Edwards, but easily distinguished by the male hypopygium with its large coxite lobe and broader styles; A.R. 0.5, L.R. 0.8, costa produced,  $Cu$  bent, wings not densely hairy, squama bare, anal point absent.

*Male.* Wing length 1.8 mm.

*Head,* mouthparts and antennae brown, eyes bare, dorsal narrow portion absent, A.R. 0.5. *Thorax* brown, dorso-central bristles more or less uniserial, pits yellowish.

*Legs* yellowish brown, L.R. about 0.8, of posterior legs about 0.6. *Wings* with a yellowish tinge, membrane with macrotrichia on apical half and in anal cell, squama bare; costa produced for half width of cell  $R_5$ ,  $R_{4+5}$  ending rather distal to tip of  $M_{3+4}$ , Cu strongly bent. Halteres with brown knobs. *Abdomen* brown; hypopygium (Text-fig. 2, a) lacking anal point, coxites with large, free, inner lobe, styles more or less rectangular.

*Female* similar to male; wings sparsely hairy in basal half, antennal segments 3-5 with short necks, segment 6 one and a half times as long as 5.

Holotype male WELLINGTON: Ohakune, v-vii.1923 (*T. R. Harris*). OTAGO: Leith Valley, Dunedin, 5 ♀, viii.1922 (*G. Howes*). Holotype and other specimens all in the British Museum.

### Genus *CRICOTOPUS* Wulp

*Cricotopus* van der Wulp, 1874, *Tijdschr. Ent.* 17: 132; Edwards, 1929, *Trans. ent. Soc. Lond.*

77: 317; Freeman, 1956, *Bull. Brit. Mus. (nat. Hist.) Entom.* 4: 303.

*Orthocladius* Hutton, 1902, *Trans. New Zealand Inst.* 34: 183 (in part).

Eyes densely pubescent; humeral pits small, dorso-central hairs minute and decumbent, the punctures from which they arise scarcely visible under a binocular microscope; abdomen often with yellow markings, hypopygium and female cerci often white; hypopygium lacking anal point; tibiae, especially anterior pair, often with a broad white ring; wings without visible microtrichia; squama fringed.

#### KEY TO NEW ZEALAND SPECIES OF *Cricotopus*

Anterior and middle tibiae with white ring in basal half . . . . .	<i>zealandicus</i> sp. n.
All tibiae uniformly brown . . . . .	<i>cingulatus</i> Hutton

### *Cricotopus zealandicus* sp. n.

Scutum shining, stripes partially fused, shoulders yellow, legs with white bands on at least front and middle tibiae, pulvilli absent, abdomen yellow on segment 1 and parts of 2, 4 and 5 and hypopygium. This species is very similar to the Palaearctic species *triannulatus* Macquart but shows differences in leg colour and in hypopygial structure.

*Male*. Wing length 2.3-2.5 mm.

*Head* yellowish brown, mouthparts and antennae blackish, A.R. about 1.2, eyes densely pubescent. *Thorax* shining and with yellow background; stripes black and more or less fused but brown at points of fusion and in prescutellar area; scutellum, postnotum and sternopleuron black. *Legs* blackish or brown, anterior pair darker than others, anterior and middle tibiae with a white ring in basal half, this ring is sometimes present also on posterior tibia; pulvilli absent, L.R. 0.8. *Wings* normal for the genus. *Abdomen* black with yellow markings; segment 1 completely yellow, 2 yellow on basal half, 3 black, 4 and 5 yellow on basal two-thirds, remainder black except for hypopygium which is yellow. Hypopygium without anal point, inner lobe of coxite not free but low and oval, styles of even width and with a triangular point near the apical spine.

*Female.* Antennae with seven segments, thorax paler than in male, stripes smaller, browner and well separated, leg markings distinct on all legs, abdomen with segments 4 and 5 almost completely yellow, cerci whitish.

Holotype male, WELLINGTON: Ohakune, iii.1923 (*T. R. Harris*). AUCKLAND: Okarahia, 1 ♂, ii.1925 (*A. Tonnoir*). WELLINGTON: Ohakune, 6 ♂, 16 ♀, iv-vii and ix-xi.1923 (*T. R. Harris*). CANTERBURY: Cass, 2 ♂, ii.1925 (*A. Tonnoir*); Akaroa, 2 ♀, xii.1924 (*A. Tonnoir*). OTAGO: Alexandra, 2 ♂ (*C. C. Fenwick*). All specimens collected by Tonnoir are in the Canterbury Museum, holotype and remainder in the British Museum.

### *Cricotopus cingulatus* Hutton

*Orthocladius cingulatus* Hutton, 1901, *Trans. New Zealand Inst.* **34**: 184.

From the description it is clear that this is a species of *Cricotopus* and Dr. Pilgrim has confirmed this by comparing the solitary type specimen with material sent to him by me. It is similar to *zealandicus*, but is darker, the thoracic stripes are more fused and the abdominal bands narrower. The main point of difference lies in the complete absence of white tibial rings, the tibiae being uniformly brown. The hypopygia of the two species are very similar.

Type locality Christchurch, type male in the Canterbury Museum.

DISTRIBUTION. WELLINGTON: Ohakune, 4 ♂, 9 ♀ (*T. R. Harris*). NELSON: Nelson, 1 ♀, ix.1923 (*A. Tonnoir*).

### Genus *TRICHOCLADIUS* Kieffer

*Trichocladius* Kieffer, 1906, *Mém. Soc. sci. Brux.* **30**: 356; Edwards, 1929, *Trans. ent. Soc. Lond.* **77**: 328 (as subg. of *Spaniotoma*); Freeman, 1956, *Bull. Brit. Mus. (nat. Hist.) Entom.* **4**: 313.

Eyes pubescent; scutum usually shining, dorso-central bristles large and erect, humeral pits unusually large in most species; wing membrane without either macrotrichia or distinguishable microtrichia, squama with complete fringe,  $R_{2+3}$  ending near mid-way between  $R_1$  and  $R_{4+5}$ .

Only one species from New Zealand is known to me in this genus.

### *Trichocladius pluriserialis* sp. n.

Male black except for shoulders, female with stripes more or less separated, prothorax silvery, pulvilli and anal point absent. This species is extremely similar to the African species *micans* Kieffer from which it may be separated by the bi- or tri-serial dorso-central bristles which form quite broad bands.

*Male.* Wing length 2-2.5 mm.

*Head* and mouthparts brown, antennae blacker, eyes densely pubescent, A.R. 1.5. *Thorax* blackish, slightly paler at the wing bases and on the shoulders, pronotum silvery; humeral pits conspicuous but not as large as in some species of the genus, dorso-central bristles bi- or tri-serial, their pits forming broad and conspicuous bands. *Legs* dark brown, trochanters yellow, pulvilli absent, L.R. 0.5. *Wings* normal for the genus, halteres yellow. *Abdomen* uniformly dark brown, hair pits

conspicuous. Hypopygium without anal point, coxite lobe moderately developed, this and the style similar to the African species *micans* Kieffer.

*Female* similar to male in general features, antennae with seven segments, thoracic stripes may be partially or completely separate.

Holotype male CANTERBURY: Christchurch, R. Purau, x. 1922 (*J. W. Campbell*). AUCKLAND: Paiaka, 3 ♀, xi-xii. 1949 (*R. A. Cumber*). WELLINGTON: Ohakune, 2 ♂, 2 ♀, xi. 1922 and iii-iv. 1923 (*T. R. Harris*). CANTERBURY: Christchurch, 3 ♂, 2 ♀, vii-ix. 1924 (*A. Tonnoir*); Governor's Bay, 1 ♀, ix. 1922 (*J. F. Tapley*); Cass, 1 ♂, 1 ♀, xi. 1924 (*A. Tonnoir*); South Canterbury, 3 ♀, ii. 1923 (*T. R. Harris*). Specimens collected by Tonnoir are in the Canterbury Museum, holotype and remainder are in the British Museum.

### Genus *DIPLOCLADIUS* Kieffer

*Diplocladius* Kieffer, 1908, *Zeit. InsektenBiol.* 4: 6; Edwards, 1929, *Trans. ent. Soc. Lond.* 77: 328 (as subg. of *Spaniotoma*); Brundin, 1956, *Inst. Freshw. Res. Drottningholm*, Rept. No. 37: 70.

*Stictocladius* Edwards, 1931, *Dipt. Pat. S. Chile.* London 2: 279 (as subg. of *Spaniotoma*).

Eyes with short but dense pubescence. Dorso-central bristles distinct, uniserial; tibial spurs well developed, the outer one of the hind tibia about half as long as the inner, pulvilli absent; wing membrane with distinguishable microtrichia, macrotrichia absent, costa slightly produced, squama often bare, when fringe present then more or less reduced. Male hypopygium with styles either double or more or less double, apex of style without spine.

*Diplocladius* was erected for a Palaearctic species, *D. cultrifer* Kieffer and *Stictocladius* for species from Patagonia and South Chile. The only real difference appears to lie in the leg and wing markings of the South American species which can hardly count as of generic significance; they also possess some hairs on the squama, but not a complete fringe. Of the New Zealand species described below, one (*D. pictus*) has plain legs and bare squama and can thus in some ways be regarded as a link between the European and Patagonian species. It lends support to Brundin's view that *Stictocladius* should be treated as a synonym of *Diplocladius*. This species in wing venation and general appearance is very similar to species formerly placed in *Smittia* and the wing pattern is not unlike that of *S. maculipennis* Goetghebuer from Africa. There are also African species, such as *S. hamata* Freeman, with hypopygium from which that of *Diplocladius pictus* could easily be derived. In this connexion it would be interesting to examine the male hypopygium of *S. maculipennis*, a species unfortunately only known in the female.

The other New Zealand species has white ringed tibiae and is similar, especially in hypopygial structure to the Patagonian species *pulchripennis* Edwards, except that its squama appears to be quite bare.

#### KEY TO NEW ZEALAND SPECIES OF *Diplocladius*

- Wings with a single dark band containing a pale area in the anal cell (Pl. XI, fig. *h*)  
*pictus* sp. n.
- Wings with two, browner bands, the outer containing at least one pale area, which  
 is in cell  $M_2$ , and often two or three (Pl. XI, fig. *g*) . . . . . *lacumiferus* sp. n.

*Diplocladius lacuniferus* sp. n.

A brownish species with white rings on the tibiae; wings with two dark bands, the outer including pale areas, costa retracted, squama bare. Male hypopygium similar to that of *D. pulchripennis* Edwards, wing markings differ from that species by the more extensive basal band and the pale lacunae in the outer band.

*Male.* Wing length 2 mm.

*Head*, mouthparts and antennae brown, face yellow, eyes densely pubescent, A.R. about 0.8. *Thorax* with yellow background; stripes, postnotum and sternopleuron blackish, dorso-central bristles well formed and erect. *Legs* brownish, each tibia with a broad central white band occupying rather more than one-third of the segment; L.R. about 0.7, pulvilli and tarsal beard absent. *Wings* (Pl. XI, fig. *g* of female) with two broad transverse dark bands; outer band not as extensive as in female and not reaching the apex of  $M_{3+4}$ , in cell  $R_5$  there is a browner area and in cell  $M_2$  an almost clear oval area; basal band reaching forward across the basal cells to the radius; costa retracted, squama apparently quite bare, halteres yellow. *Abdomen* brown, hypopygium pale. Hypopygium (Text-fig. 2, *c*) not unlike that of *pulchripennis* Edwards; short anal point present, coxite with elongate and hardly noticeable lobe, styles oval and without apical spine, basal branch present.

*Female* differs from male in colour of mesonotal stripes, the central ones being yellowish margined with brown, whilst the lateral ones are brown. Wing markings more extensive, as in Pl. XI, fig. *g*.

Holotype male and 3 ♀, CANTERBURY: Cass, xi-xii. 1924 (*A. Tonnoir*); holotype in the Canterbury Museum.

*Diplocladius pictus* sp. n.

A very small species, body and halteres brown, legs yellow, wings with a broad blackish cross-band containing a pale area in the anal cell; costa retracted, eyes pubescent, male styles double, anal point absent.

The male hypopygium of this species is similar to that of *D. lacuniferus* sp. n. and *pulchripennis* Edwards, differing in the complete absence of anal point and the differently shaped style. It is interesting because of the unringed tibiae, bare squama and retracted costa.

*Male.* Wing length 1.2 mm.

*Head* and mouthparts brown, antennae yellow, pedicel partially brown, A.R. only 0.3, last segment somewhat clubbed; eyes densely pubescent. *Thorax* dark brown and matt. *Legs* yellow, pulvilli absent, L.R. 0.6. *Wings* (Pl. XI, fig. *h*) heavily marked with a broad dark brown or blackish cross-band, leaving a clear space near the apex of the anal cell; costa retracted, slightly produced, posterior fork long,  $Cu_1$  bent, anal vein reaching beyond fork, anal angle absent, squama bare. Halteres with dark knobs and pale stems. *Abdomen* dark brown or blackish. Hypopygium (Text-fig. 2, *b*) lacking anal point, coxite lobe fairly conspicuous and

hairy; style with an apparent extra segment at base carrying a narrow process, apical spine absent.

*Female* not known.

Holotype male WELLINGTON: Ohakune, iv. 1923 (*T. R. Harris*) in the British Museum.

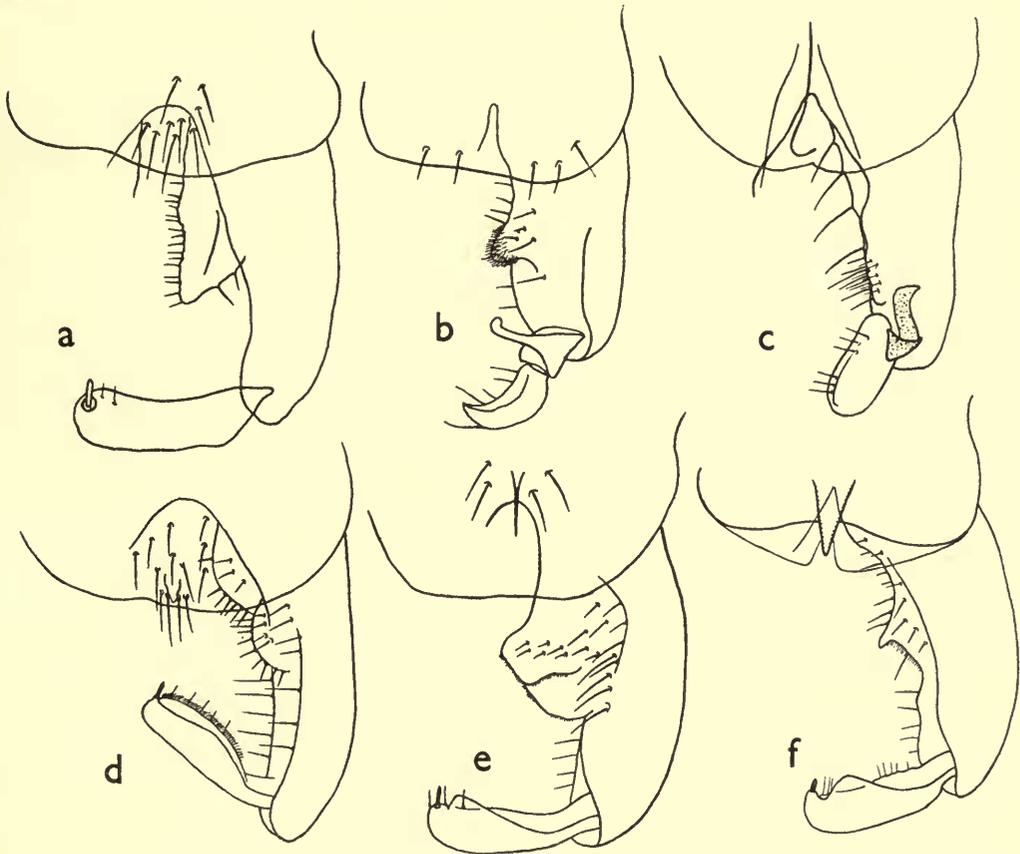


FIG. 2. Male hypopygia of Orthoclaadiinae. (a) *Metriocnemus lobifer*; (b) *Diplocladius pictus*; (c) *D. lacuniferus*; (d) *Chaetocladius harrisi*; (e) *Orthocladus pictipennis*; (f) *Smittia verna*.

### Genus *CHAETOCLADIUS* Kieffer

*Chaetocladius* Kieffer, 1911, *Bull. Soc. ent. France*, 1911: 182; Freeman, 1956, *Bull. Brit. Mus. (nat. Hist.) Entom.* 4: 325.

*Spaniotoma* subg. *Orthocladus* Groups A and B, Edwards, 1929, *Trans. ent. Soc. Lond.* 77: 337-338.

Eyes bare; humeral pits small, dorso-central hairs long and erect, their punctures easily visible; wing membrane with distinguishable microtrichia, usually visible under the low power of the microscope, readily distinguishable under a higher power; squamal fringe present; scutellum slightly and uniformly shining, the

smooth bare area at its base scarcely distinguishable; empodium distinct; Cu usually more or less straight, not sharply bent, anal lobe normally developed.

Although I have seen material of three or four species of this genus from New Zealand, I am only able to describe one species here because the others are represented by females only and the descriptions would be unsatisfactory for later recognition of the species.

*Chaetocladius harrisi* sp. n.

Uniformly brown, female antennal sensory hairs simple, costa slightly produced, posterior fork beyond r-m, squama with complete fringe, anal point of male practically absent.

*Male.* Wing length 1.6 mm.

*Head*, mouthparts and antennae brown, eyes bare, A.R. 1.0. *Thorax* uniformly brown, dorso-central bristles uniserial, but more numerous on shoulders. *Legs* brown, pulvilli absent, L.R. 0.75. *Wings* with distinguishable microtrichia; costa slightly produced, posterior fork well beyond cross-vein, Cu<sub>1</sub> slightly curved, anal lobe obtuse, squama with complete fringe. *Abdomen* uniformly brown, hypopygium (Text-fig. 2, *d*) with anal point hardly indicated, IXth tergite with a cluster of long hairs at that position, coxite lobe small, style with rather strongly developed microtrichia.

*Female* very similar to male in general structure, in one specimen paler on shoulders and around wing base; antennal segments almost cylindrical, segment 6 about one and a half times as long as 5, sensory hairs simple.

Holotype male, xii.1922 and 1 ♀, v-vii.1923, WELLINGTON: Ohakune (*T. R. Harris*) both in the British Museum.

Genus **ORTHOCLADIUS** Wulp

*Orthocladius* Wulp, 1874, *Tijdschr. Ent.* 17: 132; Freeman, 1956, *Bull. Brit. Mus. (nat. Hist.) Entom.* 4: 330.

*Spaniotoma* subg. *Orthocladius* Groups C-F, Edwards, 1929, *Trans. ent. Soc. Lond.* 77: 344-350.

Eyes bare; wing membrane without distinguishable microtrichia even under a 1/6-in. objective, usually at least slightly purplish or brownish; smooth bare area at base of scutellum usually sharply marked off from dull apical area; empodium variable, pulvilli absent; squama fringed, R<sub>2+3</sub> ending distinctly in costa, clearly separated from R<sub>4+5</sub>.

Two described species, *Orthocladius publicus* Hutton and *Dactylocladius commensalis* Tonnoir belong here, but such material as I have seen is in too poor a condition for me to offer redescriptions of them. I have seen also females of two other species but before a proper revision can be undertaken there must be much more collecting and a thorough examination of type material. I am, however, able to describe an unusual species with heavily patterned wings, a character which distinguishes it from other New Zealand species of the genus. The larva of *O. commensalis* Tonnoir is to be found living as a commensal on the ventral surface of larvae of species of Blepharoceridae.

*Orthocladius pictipennis* sp. n.

Black with brown legs and dark halteres, thorax with central stripe shining and lateral ones matt; wings strongly marked with two broad blackish transverse bands; pulvilli absent;  $M_{1+2}$  with a row of macrotrichia; anal point of male absent.

This species is unusual for the subfamily in having strongly patterned wings. Wing patterns are to be seen in some species of *Diplocladius*, in an African species of *Smittia* (see above under genus *Diplocladius*) and also in *Orthocladius calomicra* Edwards from South Chile. It differs from the last species in the absence of pulvilli, in the approximation of the radial veins as well as in the quite different wing pattern and body colour. The prothorax is more reduced centrally than is usual.

*Male.* Wing length 2 mm.

*Head*, mouthparts and antennae black or very dark brown, eyes bare, A.R. 1·3. *Thorax* totally black, central stripe slightly shining, lateral stripes and prescutellar area matt, dorso-central bristles uniserial, pits very distinct. *Legs* brown, trochanters and bases of femora yellowish, tarsi yellowish brown, anterior tarsi missing, pulvilli absent, empodium well developed. *Wings* (Pl. XI, fig. *i*) heavily marked with two broad blackish bands as shown; microtrichia indistinguishable, squama fully fringed,  $R_1$  and  $R_{4+5}$  very close, obliterating  $R_{2+3}$ ; costa strongly produced, Cu bent, An ending opposite posterior fork;  $M_{1+2}$  carrying a row of macrotrichia on the apical half; halteres black. *Abdomen* black, not shining, hypopygium (Text-fig. 2, *e*) without anal point but with a ridge in its position, coxite lobe prominent, styles with flange near apex.

*Female* resembles male in general features; antennae with six segments, segments 3–5 with well-formed necks; wing markings more extensive and encroaching much more on wing tip.

Holotype male, xi–xii.1923 and 1 ♂, i.1924 WELLINGTON: Ohakune (*T. R. Harris*) both in the British Museum. WESTLAND: Lake Moana, 2 ♂, 2 ♀, xii.1925 (*A. Tonnoir*) in the Canterbury Museum.

Genus *SMITTIA* Holmgren

*Smittia* Holmgren, 1869, *K. Svensk. Vet. Akad. Handl.* 8: 47; Freeman, 1956, *Bull. Brit. Mus. (nat. Hist.) Entom.* 4: 346.

*Camptocladius* van der Wulp, 1874, *Tijdschr. Ent.* 17: 133 (in part); Hutton, 1902, *Trans. New Zealand Inst.* 34: 185.

*Spaniotoma* subg. *Smittia* Edwards, 1929, *Trans. ent. Soc. Lond.* 77: 357.

Eyes bare or with short pubescence; wings without distinguishable microtrichia, often rather milky;  $R_{2+3}$  ending separately in the costa; posterior fork well beyond cross-vein, Cu often rather strongly curved; squama always quite bare, pulvilli usually absent.

There are representatives of three or four species in the British Museum but only one, a previously described species, includes males. I am unwilling to describe the remainder without figuring the male hypopygium.

*Smittia verna* Hutton

*Camptocladius vernus* Hutton, 1902, *Trans. New Zealand Inst.* 34: 185.

Thorax blackish, slightly shining, eyes pubescent, posterior fork long,  $Cu_1$  bent,  $Cu_2$  with false additional fork, anal vein long, male hypopygium with short anal point. I have seen cotypes of this species both from the Canterbury and British Museums.

*Male.* Wing length 1.75 mm.

*Head*, mouthparts and antennae dark brown or blackish, eyes densely pubescent, A.R. 1.6. *Thorax* uniformly blackish, slightly shining. *Legs* brown, pulvilli absent, L.R. 0.6. *Wings* without markings, squama bare, anal angle moderate, not right-angled; costa produced, posterior fork long,  $Cu_1$  bent,  $Cu_2$  with accessory false fork, anal vein long and curved. *Abdomen* uniformly dark brown, hypopygium (Text-fig. 2, f) with short, conical anal point, moderate coxite lobe, and flanged style.

*Female* similar to male.

Type series in the Canterbury Museum, cotypes in the British Museum.

DISTRIBUTION. AUCKLAND: Paiaka, 2 ♂, xi-xii.1949 (*R. A. Cumber*); Mount Albert, 3 ♂, 4 ♀, v.1915 (*A. E. Brookes*). WELLINGTON: Ohakune, 1 ♂, 2 ♀, xi.1922 and v-vii.1923 (*T. R. Harris*). CANTERBURY: type series, males and females and other specimens, Christchurch; Governor's Bay, 1 ♂, ix.1922 (*J. F. Tapley*). OTAGO: Dunedin, 1 ♂, 1 ♀ (*C. C. Fenwick*).

## SUBFAMILY CHIRONOMINAE

Eyes with dorsal narrow portion (except in *Pseudochironomus* and in one or two other non-New Zealand genera); male antennae plumose and with 11-14 segments, female antennae with five to seven segments. Pronotum sometimes collar-like, but often reduced and not visible from above, postnotal furrow distinct. Anterior tibia usually terminating on the inner side in a "scale", which may be rounded and unarmed or armed with a sharp spine; in *Riethia* (and the non-New Zealand genus *Pseudochironomus*) there is a conspicuous spur on this tibia; middle and posterior tibiae normally with two apical combs composed of basally fused spinules, the tibial spurs are associated with these combs but one or both spurs may be reduced or absent and the combs may be fused or separate. Anterior basitarsus at least as long as, and nearly always longer than, the tibia (L.R. more than 1). True base of  $M_{3+4}$  (m-cu of authors) never present,  $R_{2+3}$  present, but never connected to  $R_1$  by a cross-vein; costa almost always ending abruptly at tip of  $R_{4+5}$ . Male hypopygium not inverted, styles directed rigidly backwards and without terminal spine, coxites usually with two or more basal appendages (reduced and occasionally absent in *Chironomus* subg. *Cryptochironomus*).

There are descriptions of seven species of this subfamily in the literature, six being placed by their authors in *Chironomus* and one in *Tanytarsus*. *Chironomus zealandicus* Hudson and *novae-zealandiae* Kieffer, from an examination of compared specimens and cotypes, have been found to be descriptions of the same species which belongs to *Chironomus sensu stricto*. I have seen cotypes of *C. opimus*, *pavidus* and

*ignavus* Hutton and find that all belong to *Polypedilum*; the first two I have been able to recognize easily from my material, but of *ignavus* I have only seen two damaged females which may belong to my new species *P. canum* but cannot be identified with certainty. I am unable to recognize *C. lentus* Hutton of which I have seen no type material and Dr. Pilgrim tells me that there is no material of this species in the Canterbury Museum so far as he can see: it is very probably another species of *Polypedilum*. The species of *Tanytarsus* belongs to that genus and is redescribed below.

KEY TO TRIBES AND NEW ZEALAND GENERA OF CHIRONOMINAE

1. Wings with macrotrichia on membrane and with cross-vein r-m parallel to and practically continuous with R<sub>4+5</sub>; squama bare  
 Tribe Tanytarsini—only one genus represented—*Tanytarsus* Wulp  
 Wings usually without macrotrichia on the membrane, when present, then r-m transverse; squama usually fringed—Tribe Chironomini . . . . . 2
2. Posterior tibia with only a single spur which is normally carried on the small outer comb in those species in which the combs are not fused . . . . . 3  
 Posterior tibia with two spurs, that is, each comb with a spur . . . . . 4
3. Pulvilli easily visible in a dry specimen, in a slide mount they can be seen to be divided longitudinally; anterior tibial scale usually with a small spur; eighth abdominal segment of male constricted basally . . . . . *Polypedilum* Kieffer  
 Pulvilli only discernible in slide mounts, not divided; anterior tibia lacking both distinct scale and spur; VIIIth tergite of male abdomen not constricted basally  
*Paucispinigera* gen. n.
4. Wing membrane thickly clothed with macrotrichia . . . . . *Harrisius* gen. n.  
 Wing membrane without macrotrichia . . . . . 5
5. Anterior tibial scale rounded and unarmed; pronotum reaching up to front of mesothorax, sometimes collar-like . . . . . *Chironomus* Meigen  
 Anterior tibia either with a spur or an armed scale . . . . . 6
6. Anterior tibia with well-formed black spur with enlarged base; prothorax reaching up to front of mesonotum but narrow and not collar-like; frons without tufts of coarse forwardly projecting hair . . . . . *Riethia* Kieffer  
 Anterior tibia with small triangular scale bearing a short sharp spine; prothorax reduced and far surpassed by mesonotum; frons carrying a group of coarse hair each side, projecting forwards between antennae . . . . . *Ophryophorus* gen. n.

Genus **RIETHIA** Kieffer

*Riethia* Kieffer, 1917, *Ann. Mus. nat. Hung.* **15**: 203; Kieffer, 1921, *Ann. Soc. sci. Brux.* **40** (1): 272; Kieffer, 1921, *Ann. Soc. ent. France* **90**: 30.

Male antenna with 14 segments, female with six or seven segments, eyes with well-formed dorsal narrow portions. Prothorax applied to front of mesothorax, not collar-like. Anterior tibia with well-formed black spur, the base being enlarged as in *Pseudochironomus*, other tibiae each with a pair of subtriangular combs carrying a long spur at the apex, pulvilli present or absent. Costa neither produced nor retracted, ending above apex of M<sub>1+2</sub>, squama with complete fringe. Hypopygium without anal point, two coxite appendages present, appendage 2 in at least some species with stout pectinate spines.

Kieffer described this genus to include two Australian species, but he did not

designate either as type species. I have been unable to find any subsequent designation and I therefore designate *Riethia stictoptera* Kieffer, 1917 as the type species.

Australian material of *R. stictoptera* and Kieffer's original description show that the genus is allied to *Pseudochironomus* in spur formation but possesses well-formed dorsal narrow portions to the eyes. The Australian specimens and the New Zealand species described below show similar spurs and eyes and, in addition differ from *Pseudochironomus* in the much reduced prothorax which is hardly visible from above and is applied to the front of the mesothorax much as in *Chironomus* subgg. *Cryptochironomus* and *Dicrotendipes*; also the costa is not retracted.

The New Zealand species is extremely similar to the South Chilean *Pseudochironomus truncatocaudatus* Edwards, and I am therefore transferring this species and *melanoides* Edwards, also from Chile, to *Riethia*. The Chilean species have no pulvilli, the New Zealand species small ones, whilst in the Australian species they are well developed, illustrating that this character is not of generic significance in this part of the family.

### *Riethia zeylandica* sp. n.

Greenish with reddish thoracic markings and plain wings. In the structure of the male hypopygium and the spurs it resembles the South Chilean species *truncatocaudata* Edwards (see above), but it differs in the presence of distinct pulvilli, by the seven-segmented female antennae, by the smaller size, by the shape of appendage 1 of the male hypopygium and the smaller number of pectinate spines on appendage 2.

*Male*. Wing length 2.3–2.6 mm.

*Head* green, mouthparts brownish, pedicel reddish, A.R. 1.3, eyes with well-formed dorsal narrow portions. *Thorax* green; stripes, postnotum and sternopleuron reddish brown; dorso-central bristles uniserial, prothorax narrow and closely applied to front of mesothorax. *Legs* greenish brown, L.R. slightly more than 1, distinct pulvilli present. *Wings* unmarked; costa not produced nor retracted, ending above  $M_{1+2}$ , posterior fork slightly distal to cross-vein, halteres pale. *Abdomen* green and without darker markings. Hypopygium (Text-figs. 3, a, a') similar in general structure to *truncatocaudata* but differs as follows: margin of IXth tergite with only four long hairs, styles more pointed, appendage 1 rounded and not pointed at the apex, appendage 2 with only about six flattened pectinate spines which are placed at the extreme tip.

*Female* similar to male in colour and general structure; antennae with seven segments.

Holotype male and 4 ♂, 3 ♀, WELLINGTON: Ohakune, xi. 1922 (*T. R. Harris*) all in the British Museum.

### Genus *CHIRONOMUS* Meigen

*Chironomus* Meigen, 1803, *Illiger's Mag.* 2: 260; Freeman, *Bull. Brit. Mus. (nat. Hist.) Entom.* 5: 329.

*Dicrotendipes* Kieffer, 1913, *Voy. Alluaud Jeannel Afr. Or. Ins. Dipt.* 1: 23.

*Cryptochironomus* Kieffer, 1918, *Ent. Mitt.* 7: 46.

*Chironomus* subg. *Chironomus* Edwards, 1929, *Trans. ent. Soc. Lond.* 77: 380.

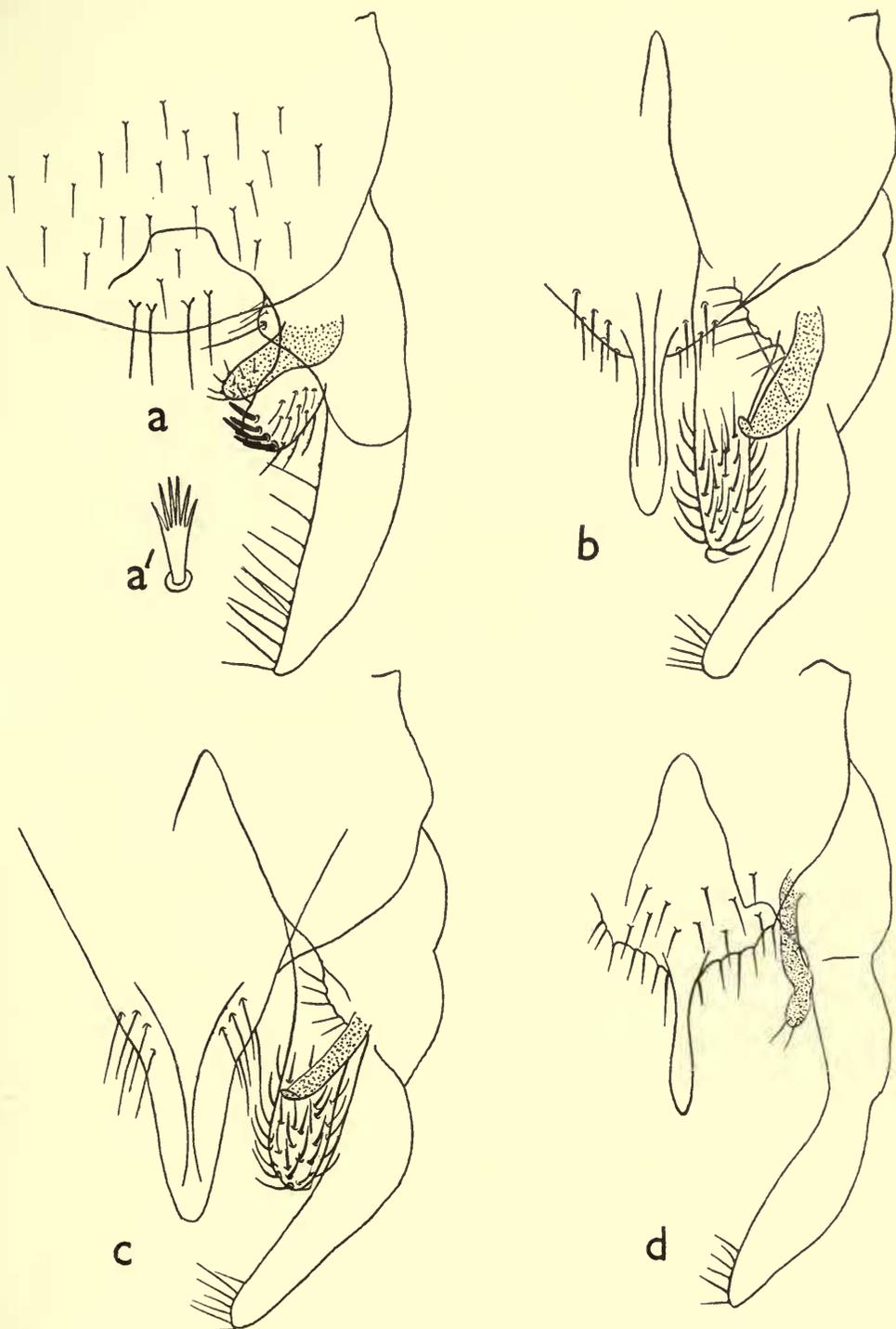


FIG. 3. Male hypopygia of *Rietha* and *Chironomus*. (a) *R. zeylandica*; (a') spine from apex of appendage 2 at higher magnification; (b) *C. (Chironomus) zealandicus*; (c) *C. (Chironomus) analis*; (d) *C. (Cryptochironomus) cylindricus*.

Male antenna with 12 segments and that of female usually with six; frontal tubercles frequently present; palpi usually long. Prothorax reaching up to front of thorax where it may form a collar with or without central emargination; often with a centrally dividing suture but the two halves are close together and not widely separated. Anterior tibia with rounded, unarmed scale, combs of middle and posterior tibiae large and each with a short spur; pulvilli large and broad. Wing membrane without macrotrichia, squama with complete fringe.

Four New Zealand species of *Chironomus*, falling into three subgenera are known to me but doubtless others remain to be found. All are quite typical of the groups to which they belong. Six species have been placed by previous authors in the genus, but, as stated above, it is probable that only two of these really belong here.

KEY TO NEW ZEALAND SPECIES OF *Chironomus*

1. Prothorax collar-like and with a well-marked V-shaped central emargination; frontal tubercles present (*Chironomus s. str.*) . . . . . 2  
     Prothorax narrower and applied to front of mesonotum, with a centrally dividing suture; frontal tubercles absent . . . . . 3
2. Anal point of male narrow (Text-fig. 3, *b*) . . . . . *Ch. (Ch.) zealandicus* Hudson  
     Anal point of male stout (Text-fig. 3, *c*) . . . . . *Ch. (Ch.) analis* sp. n.
3. Front legs with apex of femur and whole of tibiae and tarsi dark brown  
     . . . . . *Ch. (Dicrotendipes) canterburyensis* sp. n.  
     All legs green with only tarsi darker . . . . . *Ch. (Cryptochironomus) cylindricus* sp. n.

***Chironomus (Chironomus) zealandicus* Hudson**

*Chironomus zealandicus* Hudson, 1892, *Manual of New Zealand Entomology*. London, p. 43;

Hutton, 1902, *Trans. New Zealand Inst.* 34: 181.

*Chironomus novae-zelandiae* Kieffer, 1921, *Ann. Soc. Linn. Lyon.* 68: 146 (*syn. nov.*).

A typical species of the subgenus, very similar to others from other parts of the world. Thorax yellowish or greenish brown with greyish pruinosity and dark stripes; anterior tarsi bearded, abdominal segments dark and with apical third yellowish or greenish, hypopygium with narrower anal point than in the next species.

*Male.* Wing length 4–6 mm.

*Head* yellowish or greenish brown, mouthparts dark brown, frontal tubercles present, antennae dark brown, A.R. about 4. *Thorax* with yellowish brown background, shoulders and lateral margins paler; stripes, postnotum and sternopleuron dark brown, prescutellar area usually brown as well; whole thorax with slight greyish pruinosity. *Legs* yellowish or greenish brown, dark only at tips of tarsi; anterior tarsus well bearded, L.R. 1.3. *Wings* with darkened cross-vein, halteres yellow. *Abdomen* usually dark brown with about apical third of each segment yellowish or greenish and slightly pruinose, but the size of the pale parts varies and may be greater or lesser; hypopygium (Text-fig. 3, *b*) of a very normal *Chironomus plumosus* type, anal point narrower than in *analis* sp. n.

*Female* very similar to male, but abdomen darker and rather more pruinose; anterior tarsi not bearded.

I have not seen Hudson's type specimens which are in the Dominion Museum, Wellington, but I have seen a number identified by Hutton who would presumably

have had access to the Hudson Collection ; type locality, Christchurch. The type series of *novae-zelandiae* is in the Berlin Museum and I have been able to borrow some of these ; I have marked a male from Wellington as lectotype.

DISTRIBUTION. It is a common species and I have seen about 100 specimens from the following localities. AUCKLAND : Paiaka, Mt. Albert, Tamaki, Wairoa. WELLINGTON : Ohakune, Makerua. NELSON : Blackball. WESTLAND : Otira, " West Coast ". CANTERBURY : Christchurch, Governor's Bay, New Brighton, Rolleston, " S. Canterbury ".

*Chironomus (Chironomus) analis* sp. n.

This species is very similar to *zealandicus* in general appearance, but the male anal point is much heavier and stouter (Text-fig. 3, c). In colour it tends to be rather paler and the male abdomen is green with a saddle-shaped dark mark placed in the basal two-thirds of each of segments 2-5. In other structural features the two species are identical.

Holotype male NELSON : Blackball, v.1920 (*J. W. Campbell*). WELLINGTON : Ohakune, 1 ♂, 3 ♀ (*J. W. Campbell* and *T. R. Harris*). WESTLAND : W. Coast, 1 ♂, ii.1925 (*T. R. Harris*). OTAGO : Queenstown, 1 ♂, xii.1919 (*T. R. Harris*). All specimens are in the British Museum.

*Chironomus (Dicrotendipes) canterburyensis* sp. n.

Thorax yellowish green and shining with three dark brown well separated stripes, bristles dark ; front tibiae and tarsi dark brown, all femora dark at tips ; abdomen plain green with dark bristles. Although the male is not known, I am describing this species because it should be easily recognized by the colour and pattern. It is the only species of the subgenus known to me from New Zealand.

*Female.* Wing length 4 mm.

*Head*, mouthparts and antennae brown, pedicel yellow ; segments 2-5 of antennae with long narrow necks which are almost as long as basal bulbs, segment 6 one and a half times as long as 5, frontal tubercles absent. *Thorax* shining yellowish green ; stripes and apical half of postnotum dark brown, stripes separate, prescutellar area green ; dorso-central bristles uniserial anteriorly, both they and lateral bristles dark brown and rather conspicuous against the pale background. *Legs* with green femora tipped with brown, front tibiae and tarsi entirely dark brown, tibiae of posterior four legs green tinged with brown, tarsi of these legs brown ; L.R. 1.5 ; pulvilli well developed, fifth segment of anterior tarsus half as long as fourth and cylindrical, tibial combs wide, spurs short. *Wings* plain, squama fringed,  $R_{2+3}$  ending in contact with  $R_1$ , halteres green. *Abdomen* plain green with brown bristles.

Holotype female and 2 ♀, South Canterbury, ii.1923 (*T. R. Harris*), all in the British Museum.

*Chironomus (Cryptochironomus) cylindricus* sp. n.

Green with reddish thoracic markings and narrow dark bands at the abdominal incisures of the male ; hypopygium with long, narrow, cylindrical appendage 1.

*Male.* Wing length 2.5-2.75 mm.

*Head* green, palpi and antennae brownish, pedicel reddish, A.R. 1.5, frontal tubercles absent. *Thorax* green; stripes, postnotum and sternopleuron reddish yellow, dorso-central bristles uniserial and pale. *Legs* green, tarsi darker, L.R. 1.5, combs fused and each with a short spur. *Wings* plain, squama fringed, halteres green. *Abdomen* green, segments 1-4 each with a narrow dark band at apex, extended slightly on to the base of each succeeding segment so that band is properly at the incisure. Hypopygium (Text-fig. 3, *d*) with characteristic shaped styles, long anal point and cylindrical appendage 1.

*Female* similar to male but abdomen plain green; antennae with segments 3-5 lacking long necks.

Holotype male South Canterbury, ii. 1923 (*T. R. Harris*). AUCKLAND: Paiaka, 5 ♂, 11 ♀, xi-xii. 1949 (*R. A. Cumber*), holotype and other specimens all in the British Museum.

#### Genus *HARRISIUS* gen. n.

Antennae of male with 14 segments, of female with six, although the second segment is deeply indented; frontal tubercles absent, palpi not reduced. Pronotum much reduced and far surpassed by mesonotum which projects as a cone over the head very much as in *Stenochironomus*; acrostichal bristles long and with distinct pits and easily visible as a double row extending back to middle of scutum. Wing membrane thickly clothed with macrotrichia, squama fringed;  $R_{2+3}$  close to  $R_1$  at the apex. Scale of anterior tibia oval and rather longer than in *Chironomus s. str.* but not as long as in *Stenochironomus*, without a spur; pulvilli present; combs of middle and posterior tibiae fused and each with a spur. Male hypopygium with two pairs of coxite appendages and without the lengthening of appendage 2 and style shown by *Stenochironomus*, appendage 2 also lacks a movable spine at the apex.

Type of genus *H. pallidus* sp. n.

In general appearance and in most of its characters this genus resembles *Stenochironomus* but it is to be distinguished by the hairy wings and differently constructed male hypopygium. There are specimens of another, as yet undescribed, species in the British Museum from New Guinea.

#### *Harrisius pallidus* sp. n.

A small pale green species with yellowish thoracic markings; readily distinguished from other New Zealand Chironomids by the hairy wings and the male genital structure.

*Male*. Wing length 2.5-2.75 mm.

*Head*, mouthparts and antennae greenish yellow, A.R. 1.5. *Thorax* very pale greenish yellow; stripes, postnotum and sternopleuron yellow. *Legs* greenish white; anterior tibia subequal to femur, L.R. 1.2, beard absent. *Wings* quite unmarked and with macrotrichia almost to the base, halteres white. *Abdomen* pale green, hypopygium (Text-fig. 4, *a*) simple, appendage 1 rather long and curved, appendage 2 with a few apical bristles.

*Female* similar to male.

Holotype male and 4 ♂, 10 ♀, WELLINGTON: Ohakune, x.1922–iii.1923 and xi.1923 (*T. R. Harris*). AUCKLAND: Kaitaia, 1 ♂, ii.1917 (*J. Muggeridge*); Tuakau, 2 ♀, ii.1917 (*J. Muggeridge*). WESTLAND: Lake Moana, 2 ♂, xii.1925 (*A. Tonnoir*). CANTERBURY: Christchurch, R. Purau, x.1922 (*J. W. Campbell*); Cass, 2 ♂, 2 ♀, xii.1924 (*A. Tonnoir*); Hilltop, 2 ♀, i.1925 (*A. Tonnoir*). Specimens collected by Tonnoir are in the Canterbury Museum, holotype and remainder are in the British Museum.

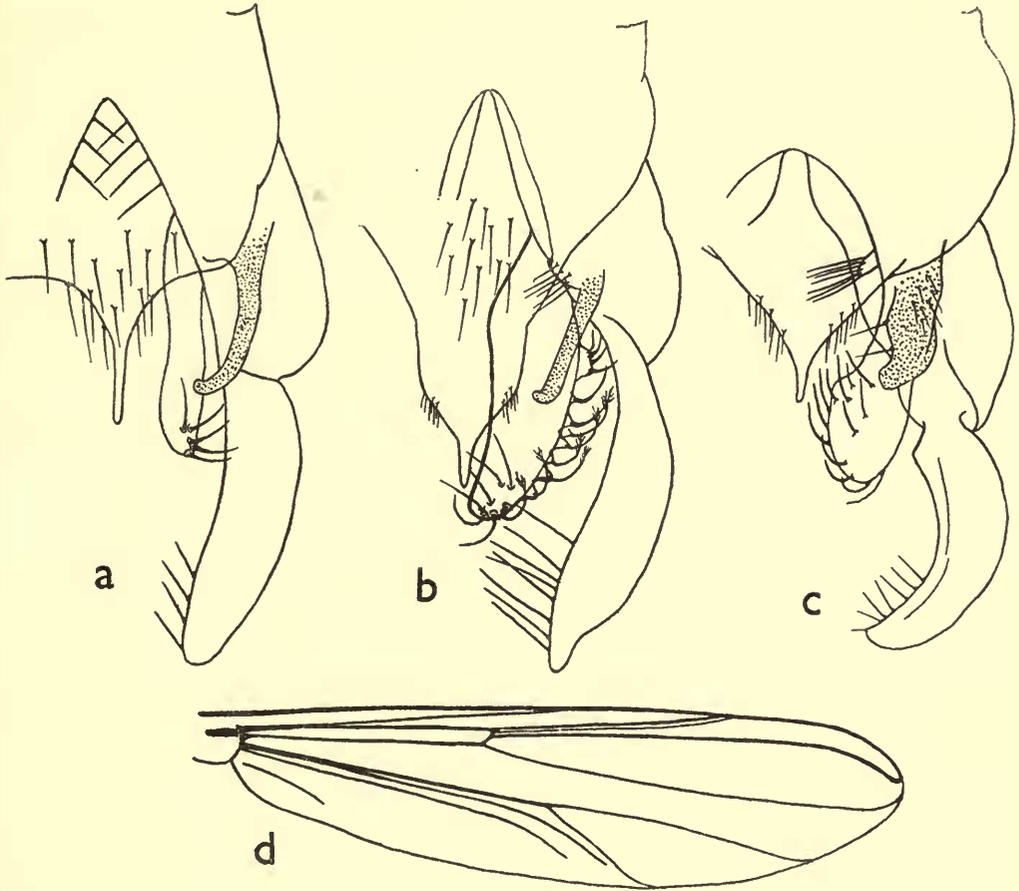


FIG. 4. Chironominae. (a) Male hypopygium of *Harrisius pallidus*; (b) hypopygium of *Ophryophorus ramiferus*; (c) hypopygium of *Paucispinigera approximata*; (d) wing of *P. approximata*.

#### Genus *OPHRYOPHORUS* gen. n.

Antennae of male with 14 segments, of female with six and segment 2 is deeply indented; frontal tubercles absent, but frons with a group of long coarse hairs each side projecting forwards between antennae; palpi not reduced. Pronotum much reduced and surpassed by mesonotum which projects as a cone over

head as in *Stenochironomus* and *Harrisius*; acrostichal bristles long, arising from distinct pits and easily visible as a double row extending back to middle of scutum. Wing membrane without macrotrichia, squama fringed,  $R_{2+3}$  close to  $R_1$  at apex. Scale of anterior tibia not very large, triangular and with a short sharp spine at the apex; pulvilli present; combs of middle and posterior tibiae fused and each fused pair carrying two spurs. Male hypopygium with two pairs of coxite appendages, the hairs on appendage 2 of the type species branched at the apices.

Type species of the genus *O. ramiferus* sp. n.

The single species placed in this genus bears a resemblance in thoracic structure to *Stenochironomus* and *Harrisius*, but it can be distinguished from the former by the quite different male hypopygium, from the latter by the bare wings and from them both by the two groups of coarse hairs on the frons.

### *Ophryophorus ramiferus* sp. n.

Thorax pale with reddish stripes, abdomen very dark brown, distinguished from other New Zealand Chironomids by the generic characters and by the male hypopygium with its curious branched hairs.

*Male.* Wing length 3 mm.

*Head* yellowish, antennae brown, A.R. about 1.8. *Thorax* pale yellow; stripes reddish, sternopleuron and postnotum brown. *Legs* yellow, apices of anterior femora and tibiae slightly darkened, tarsal beard absent, L.R. 1.3. *Wings* unmarked, costa rather long and  $R_{4+5}$  curved at the apex. *Abdomen* very dark brown; hypopygium (Text-fig. 4, *b*) quite characteristic; IXth tergite of an unusual shape, with anal point at apex of conical extension of the tergite, appendage 1 simple, appendage 2 with branched hairs along the outer margin, styles contracted at extreme apex.

*Female* very similar to male but abdomen is pale.

Holotype male and 9 ♂, 13 ♀, WELLINGTON: Ohakune, xi.1922-iv.1923 (*T. R. Harris*) all in the British Museum.

### Genus *PAUCISPINIGERA* gen. n.

Antennae of male with 14 segments, of female with six, frontal tubercles absent, palpi not reduced. Pronotum not greatly reduced, reaching more or less up to front of mesonotum; acrostichal bristles well developed.  $R_{2+3}$  only slightly separated from  $R_1$  at apex,  $R_{4+5}$  and costa curved round right to the apex of the wing where they are only slightly separated from  $M_{1+2}$  which is curved upwards at the apex; posterior fork well distal to cross-vein; wing membrane without macrotrichia but they are present on  $M_{1+2}$  and in the female on  $M_{3+4}$  as well; squama fringed. Anterior tibia without either distinct scale or spur, combs of other tibiae fused and each fused pair with only a single spur; pulvilli only visible in slide preparations and not divided, empodium well formed. Male hypopygium very similar in structure to *Paratendipes*, appendage 2a small but distinct; segment 8 not constricted basally.

Type species *P. approximata* sp. n.

From the structure of the male hypopygium this species could easily be placed in *Paratendipes*, but it is precluded from that genus by the presence of only one posterior tibial spur and the absence of an anterior tibial spur. In the presence of macrotrichia on the medial vein and the approximation of  $R_{4+5}$  and  $M_{1+2}$ , the species resembles *Polypedilum opimus* Hutton but it does not belong to *Polypedilum* because of the reduced and simple pulvilli, the simple apex of the anterior tibia and the unstricted base of the eighth segment of the male abdomen.

*Paucispinigera approximata* sp. n.

Green with reddish thoracic markings, easily separated from other species by the approximation of veins  $R_{4+5}$  and  $M_{1+2}$  with macrotrichia on the latter and by the *Paratendipes*-like male hypopygium.

*Male.* Wing length 2-2.6 mm.

*Head* and antennal pedicel yellow, palpi darker, A.R. 1.3. *Thorax* yellowish green with reddish stripes, postnotum and sternopleuron. *Legs* pale yellow, L.R. 1.3. *Wings* unmarked, venation as in Text-fig. 5, *d*,  $M_{1+2}$  with macrotrichia on apical half. *Abdomen* plain green, hypopygium as in Text-fig. 5, *c*.

*Female* similar to male in colour, vein  $M_{1+2}$  with macrotrichia for most of its length, macrotrichia also present on  $M_{3+4}$  from fork to wing margin.

Holotype male and 9 ♂, 8 ♀, WELLINGTON: Ohakune, x-xii.1922 and iv-vii.1923 (*T. R. Harris*). MARLBOROUGH: Goose Bay, 1 ♂, iv.1925 (*A. Tonnoir*). WESTLAND: Lake Moana, 3 ♂, xii.1925 (*A. Tonnoir*). CANTERBURY: Hilltop, 1 ♂, iv.1923 (*A. Tonnoir*). Specimens collected by Tonnoir are in the Canterbury Museum, holotype and remainder are in the British Museum.

Genus **POLYPEDILUM** Kieffer

*Polypedilum* Kieffer, 1913, *Bull. Soc. Hist. nat. Metz* 28: 15; Freeman, 1958, *Bull. Brit. Mus. (nat. Hist.) Entom.* 6: 266.

*Pentapedilum* Kieffer, 1913, *Bull. Soc. Hist. nat. Metz* 28: 25.

*Chironomus* subg. *Polypedilum* Edwards, 1929, *Trans. ent. Soc. Lond.* 77: 401.

*Pentapedilum* subg. *Pentapedilum* Edwards, 1929, *ibid.* 77: 376.

Male antenna 14-segmented, of female six-segmented, frontal tubercles only occasionally present. Pronotum moderately developed, both acrostichal and dorso-central bristles well developed; anterior tibial scale with a short spur, middle and posterior tibial spurs with only a single spur for each pair; pulvilli split longitudinally into narrow lobes (only clearly visible in slide mounts). Wing membrane bare or with macrotrichia and either unmarked or with dark clouds and spots; squama with complete fringe. Eighth abdominal segment of male constricted basally so as to appear triangular; anal point well formed, two coxite appendages present or occasionally three, appendage 2 usually with a long terminal hair.

There are seven species of this genus in the material at my disposal, one being a species previously known only from Africa south of the Sahara. Two are species which have already been described by Hutton in the genus *Chironomus*, the other four I am describing as new although it may later be shown that *P. canum* sp. n.

is a redescription of another species of Hutton's—*Chironomus ignavus*. *Chironomus lentus* Hutton may also belong here but I cannot place it without examination of the type series.

All the species are fairly typical of the genus with the possible exception of *opimus*, a species in which vein  $R_{4+5}$  is strongly curved and both branches of M carry macrotrichia, features in which it resembles the new genus *Paucispinigera*. However, in other respects, including the split pulvilli and constriction of the VIIIth tergite of the male, it resembles *Polypedilum*. All the species belong to the typical subgenus, subgenus *Pentapedilum* not so far being recorded.

#### KEY TO NEW ZEALAND SPECIES OF *Polypedilum*

- |  |                          |
|--|--------------------------|
| 1. Wings with dark markings and clouds . . . . .   | 2                        |
| Wings unmarked . . . . .   | 4                        |
| 2. $R_{4+5}$ very strongly curved, both branches of M with macrotrichia (Pl. XI, fig. l)   |                          |
|  | <i>opimus</i> Hutton     |
| $R_{4+5}$ practically straight, both branches of M bare . . . . .  | 3                        |
| 3. Wing length 1.3–1.5 mm., wing markings more definite and including a dark spot basal to the cross-vein (Pl. XI, fig. k) . . . . . | <i>longicrus</i> Kieffer |
| Wing length 3.5–4 mm., wing markings more vague, this spot absent (Pl. XI, fig. j)   |                          |
|  | <i>pavidus</i> Hutton    |
| 4. Abdomen with pale markings or pale with dark markings, costal cell rounded at tip   | 5                        |
| Abdomen dark brown or black without pale markings, costal cell pointed . . . . .   | 6                        |
| 5. Abdominal segments dark with pale markings at apices . . . . .  | <i>harrisi</i> sp. n.    |
| Abdominal segments pale with dark apical bands . . . . .   | <i>digitulus</i> sp. n.  |
| 6. Abdomen blackish and without pruinose bands . . . . .   | <i>cumberi</i> sp. n.    |
| Abdomen dark brown or blackish with pruinose bands at apices of segments   |                          |
|  | <i>canum</i> sp. n.      |

#### *Polypedilum (Polypedilum) pavidus* Hutton

*Chironomus pavidus* Hutton, 1902, *Trans. New Zealand Inst.* 34: 183.

A fairly large and typical blackish species with grey pruinosity on the thorax; wings with faint grey clouds which are better developed in the female;  $R_{4+5}$  nearly straight; anterior tarsi of male bearded.

*Male*. Wing length 3.5–4 mm.

*Head*, antennae and mouthparts dark brown or blackish, A.R. over 4. *Thorax* blackish with pruinosity on shoulders, along line of dorso-central bristles and on prescutellar area. *Legs* dark brown, tibiae slightly paler, anterior tibial scale apparently unarmed, L.R. 1.25, anterior tarsi with long but scanty beard. *Wings* (Pl. XI, fig. j of female) with faint grey spots as shown;  $R_{4+5}$  more or less straight. *Abdomen* blackish and with long pale hairs, each segment pruinose basally but not strikingly so. Hypopygium (Text-fig. 5, a) quite normal for the genus.

*Female* resembles male.

I have seen three specimens of the type series which is in the Canterbury Museum. A male agrees with Hutton's description, but of the two females, one is *Trichocladius pluriserialis* and the other a species of *Chaetocladus*. Type locality, Christchurch.

DISTRIBUTION. AUCKLAND: Paiaka, 1 ♀, xi–xii.1949 (R. A. Cumber). WEL- LINGTON: Ohakune, 3 ♂, 1 ♀, x–xi.1922 (T. R. Harris). WESTLAND: Lake Moana,

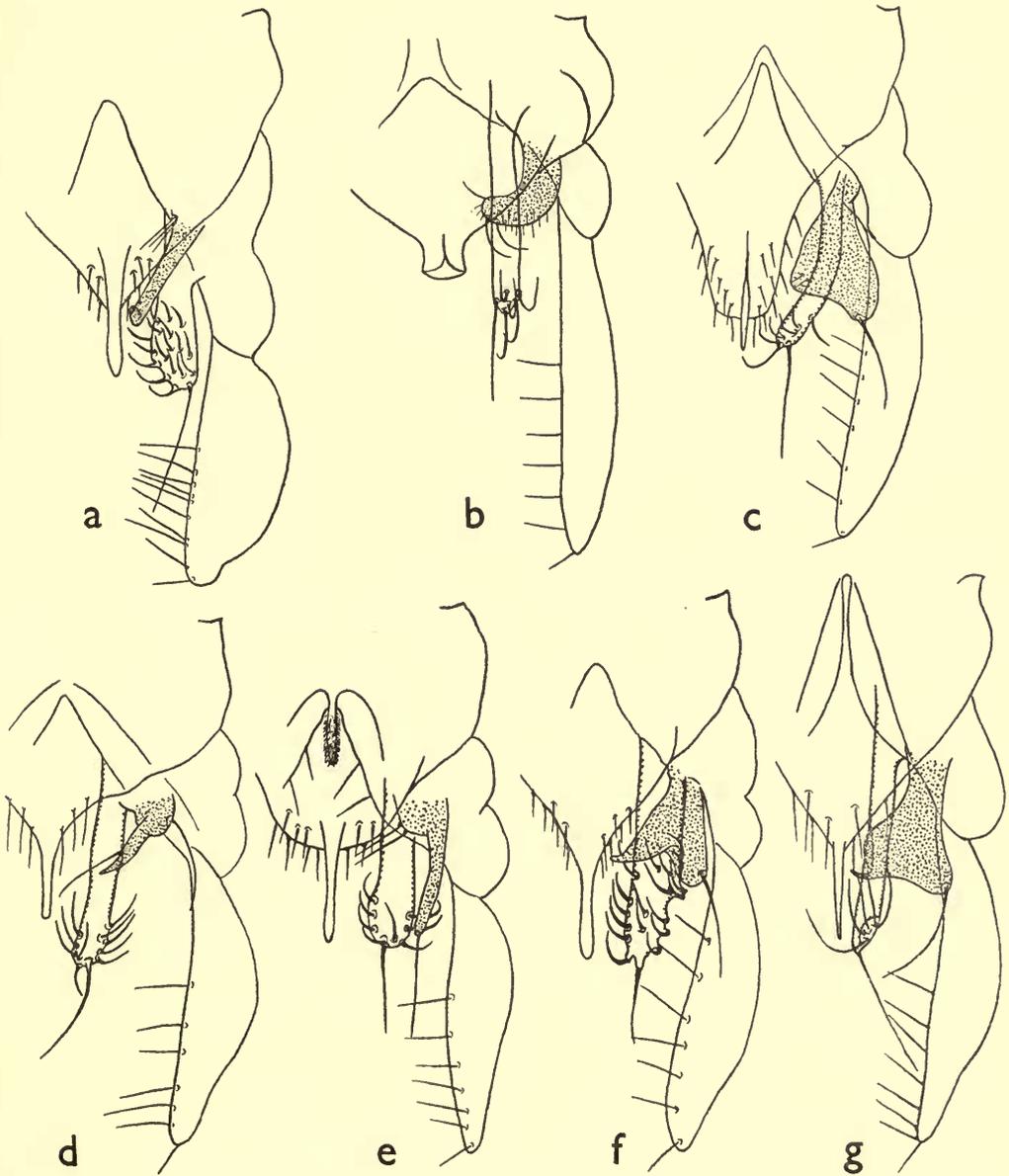


FIG. 5. Hypopygia of *Polypedilum*. (a) *P. pavidus*; (b) *P. longicrus*; (c) *P. opimus*; (d) *P. harrisi*; (e) *P. digitulus*; (f) *P. cumberi*; (g) *P. canum*.

1 ♀, xii.1925 (*A. Tonnoir*). CANTERBURY: Christchurch, male of type series and 1 ♂, 1 ♀, x.1924 (*A. Tonnoir*).

*Polypedilum (Polypedilum) longicrus* Kieffer

*Polypedilum longicrus* Kieffer, 1921, *Ann. Soc. sci. Brux.* 40 (1): 101; Freeman, 1958, *Bull. Brit. Mus. (nat. Hist.) Entom.* 6: 279.

*Polypedilum longicrus* has previously been known as an African species and is particularly common along the Nile in the Sudan. The two specimens from New Zealand agree exactly with African material in colour, wing pattern and male hypopygial structure and I can see no reason for separating them as a distinct species. It may have been introduced to New Zealand from Africa, or it may simply be a wide-spread species in the warmer parts of the world. It is a small species with patterned wings, easily distinguished from other New Zealand species by the wing pattern, straight vein  $R_{4+5}$  and by the male hypopygium with its broad, sharply down-turned anal point.

*Male.* Wing length 1.3–1.5 mm.

*Head*, mouthparts and antennae brown, A.R. about 1.1. *Thorax* brown with some pruinosity especially in prescutellar area. *Legs* yellowish, femora darker basally, tibial scale oval and with short spur, L.R. 1.8, anterior tarsi not bearded. *Wings* (Pl. XI, fig. *k*) with characteristic pattern which includes a spot basal to the cross-vein,  $R_{4+5}$  straight; halteres pale. *Abdomen* dark brown; hypopygium (Text-fig. 5, *b*) with short broad anal point which is sharply turned downwards, appendage 1 stout and curved, with three longer curved hairs, appendage 2 with about five hairs at the apex.

*Female* not known from New Zealand material, but in Africa it resembles the male.

The holotype is lost (type locality BELGIAN CONGO: Go).

DISTRIBUTION. AUCKLAND: Paiaka, 2 ♂, xi–xii.1949 (*R. A. Cumber*).

*Polypedilum (Polypedilum) opimus* Hutton

*Chironomus opimus* Hutton, 1901, *Trans. New Zealand Inst.* 34: 182.

Green or yellowish green, thoracic stripes reddish yellow; abdomen with vague dark markings; wings with a dark spot over cross-vein and another at apex of anal cell,  $R_{4+5}$  strongly curved so that tip of cell almost reaches  $M_{1+2}$  which carries macrotrichia; posterior femora with a dark band near the centre; IXth tergite of male truncate. This species is easily recognized by the wing pattern and venation, by the band on the femora and by the male hypopygium.

*Male.* Wing length 2.5–3 mm.

*Head*, mouthparts and antennae brown, A.R. 1.3. *Thorax* green, mesonotal stripes reddish yellow, each of central ones with a small dark brown line anteriorly, lateral ones with a brown spot just anterior to wings; postnotum brown on apical half, pleura brown and with a pale longitudinal median stripe. *Legs* yellowish or greenish, anterior tibia dark sub-basally, anterior femora with a broad subapical dark band, other legs usually narrowly dark above and below the knees and with a dark band a little before the middle of the femur; L.R. 1.25. *Wings* (Pl. XI, fig. *l*

of female) with dark clouds over cross-vein and at apex of anal cell, in addition there may be variable and more vague dark markings near the apex;  $R_{4+5}$  and the costa much curved round apex so that they nearly touch  $M_{1+2}$ ; both branches of media with macrotrichia on apical half. Halteres yellow. *Abdomen* green, each segment narrowly pruinose at apex and with variable dark markings which may be completely absent. Hypopygium (Text-fig. 5, c) with quite characteristic IXth tergite which is drawn out and truncate at apex, anal point curved and finger-like in lateral aspect, appendage 1 bulky in most specimens and with a long seta on the outer angle, but the exact shape is variable and it may be a good deal smaller, appendage 2 narrow and with about six hairs at the apex.

*Female* resembles male in colour and pattern.

I have seen three specimens of the type series which is in the Canterbury Museum and Dr. Pilgrim has been kind enough to compare further specimens for me (type locality, Christchurch and Auckland).

DISTRIBUTION. AUCKLAND: Paiaka, 5 ♂, 2 ♀, xi-xii.1949 (*R. A. Cumber*). WELLINGTON: Ohakune, 2 ♂, 16 ♀, ii-vii and x-xi.1923 (*T. R. Harris*). CANTERBURY: Christchurch, R. Purau, 2 ♂, x.1922 (*J. W. Campbell*); Christchurch, 3 ♂ (*A. Tonnoir*); New Brighton, Dyer's Road, 6 ♂, 2 ♀, iv.1922 (*J. W. Campbell*).

#### *Polypedilum (Polypedilum) harrisi* sp. n.

Wings plain, mesonotum pale brown, abdomen with yellow markings on segments 1-5, femora dark at apices,  $R_{4+5}$  curved; appendage 1 of male hypopygium narrow and with subapical long hair. The curved radial vein and simple hypopygium are sufficient to distinguish this species from the others described here.

*Male*. Wing length 3.25 mm.

*Head*, mouthparts and antennae brown, A.R. 1.8. *Thorax* with pale brown mesonotum lacking pruinosity; pleura and postnotum dark brown. *Legs* yellowish, apices of femora brown, anterior tarsi missing. *Wings* without markings,  $R_{4+5}$  curved but not as strongly as in *opimus*, costal cell rounded at apex; halteres with dark knobs. *Abdomen* dark brown with yellow markings as broad spots at apices of segments 2-4, segment 1 mostly yellow, segment 5 with narrow yellow band; markings on segments 1-5 encroach on to base of succeeding segment. Hypopygium (Text-fig. 5, d) simple, anal point well formed, appendage 1 narrow though broader basally and with a long subapical seta and another at the base, appendage 2 narrow.

*Female* not known.

Holotype male WELLINGTON: Ohakune, xi.1923 (*T. R. Harris*) in the British Museum.

#### *Polypedilum (Polypedilum) digitulus* sp. n.

Wings plain,  $R_{4+5}$  strongly curved but less strongly than in *opimus*; mesonotum brown and with pruinosity, abdomen yellowish with dark bands at apices of segments. Distinguishable from *harrisi* by the abdominal segments being dark at apices and by the presence of a cylindrical, finger-like process between the coxites of the male.

*Male*. Wing length 2-2.75 mm.

*Head*, mouthparts and antennae dark brown, A.R. 1·8. *Thorax* with mesonotum brown with changeable pruinosity, pleura and postnotum dark brown, bristles pale. *Legs* yellow, knees vaguely darkened, L.R. 1·5. *Wings* unmarked,  $R_{4+5}$  strongly curved, but not quite as strongly as in *opimus*, costal cell rounded at apex, halteres yellow. *Abdomen* yellowish, each tergite with a dark band at the apex; hypopygium (Text-fig. 5, *e*) not unlike *harrisi* but with an additional finger-like process between the bases of the coxites; appendage 1 rather longer and narrower and with a long hair at the extreme apex.

*Female* resembles male in colour and wing venation.

Holotype male WELLINGTON: Ohakune, x-xi.1923 (*T. R. Harris*); other specimens with same data, 2 ♂, 2 ♀, x-xi.1922 and 1 ♀ iv.1923 all in the British Museum.

### *Polypedilum (Polypedilum) cumberi* sp. n.

A small blackish species with pruinosity on the mesonotum; wings plain,  $R_{4+5}$  curved, costal cell pointed at apex; abdomen dark and unmarked, hypopygium with large bilobed appendage 1. This species is not unlike the next one but it may be distinguished by the plain abdomen as well as by the structure of the hypopygium.

*Male*. Wing length 2·0 mm.

*Head*, mouthparts and antennae very dark brown, A.R. only 0·75. *Thorax* black, slightly shining and with pruinosity especially along the lines of dorso-central bristles and in prescutellar area. *Legs* dark brown, L.R. hardly more than 1. *Wings* without markings,  $R_{4+5}$  curved but not strongly, costal cell pointed, posterior fork considerably beyond cross-vein, halteres dark. *Abdomen* blackish and shining; hypopygium (Text-fig. 5, *f*) with well-formed anal point, appendage 1 large and bilobed with a long bristle on outer lobe; differing mostly from *canum* by the numerous and strong curved bristles on appendage 2 which is also stouter.

*Female* resembles male in colour and venation.

Holotype male and 23 ♂, 4 ♀, AUCKLAND: Paiaka, xi-xii.1949 (*R. A. Cumber*) all in the British Museum.

### *Polypedilum (Polypedilum) canum* sp. n.

? *Chironomus ignavus* Hutton, 1902, *Trans. New Zealand Inst.* 34: 183.

This may be the species described by Hutton as *Chironomus ignavus* of which I have only seen two damaged female cotypes. These enable me to place the species in the correct genus but it is not possible to be certain of the identity of the species until better material, including males, of his series can be examined. *P. canum* is a dark coloured species with blackish abdomen which has pruinose bands at the apices of the segments; wings plain,  $R_{4+5}$  curved, cell pointed at the apex. Distinguished from *cumberi* by the pruinose abdominal bands and the reduced number of hairs on appendage 2 of the hypopygium, as well as by the broader appendage 1.

*Male*. Wing length 3 mm.

*Head*, mouthparts and antennae brown, A.R. 1·8. *Thorax* brown, lateral mesonotal stripes rather darker brown, with pruinosity especially along lines of dorso-

central bristles and in prescutellar area. *Legs* yellowish, slightly darkened at apices of femora, L.R. 1.3. *Wings* unmarked,  $R_{4+5}$  curved, costal cell pointed at apex, posterior fork only slightly beyond cross-vein, halteres dark. *Abdomen* very dark brown or blackish, each segment with a band of pruinosity at the apex when viewed from behind. Hypopygium (Text-fig. 5, g) with broad appendage 1 which is slightly indented at apex and with a small finger-like process at inner angle, outer angle with a long curved seta; appendage 2 narrow and with only about six hairs at the extreme apex.

*Female* resembles male in colour and venation.

Holotype male and 1 ♂, 2 ♀, WELLINGTON: Ohakune, xi. 1923 (*T. R. Harris*) all in the British Museum. *C. ignavus* was described from specimens collected at Christchurch.

### Genus *TANYTARSUS* Wulp

*Tanytarsus* van der Wulp, 1874, *Tijdschr. Ent.* 17: 134; Freeman, 1958, *Bull. Brit. Mus. (nat. Hist.) Entom.* 6:

Combs of posterior tibiae at least narrowly separated ventrally and occupying at most half circumference of tibia, usually both with a spur but one or both spurs may be absent. Wing membrane with a variable number of macrotrichia,  $R_{4+5}$  ending at level of or beyond tip of  $M_{3+4}$ , anal area more or less developed. Scutellum usually with several long marginal bristles but in small species the central pair is the longest.

Both the New Zealand species known to me belong to the subgenus *Tanytarsus* s. str.

#### KEY TO NEW ZEALAND SPECIES OF *Tanytarsus*

- Combs of posterior tibiae unarmed, apex of  $R_{4+5}$  opposite apex of  $M_{3+4}$  *vespertinus* Hutton  
 Combs each with a strong spur, apex of  $R_{4+5}$  beyond apex of  $M_{3+4}$  . *funebri* sp. n.

### *Tanytarsus (Tanytarsus) vespertinus* Hutton

*Tanytarsus vespertinus* Hutton, 1901, *Trans. New Zealand Inst.* 34: 185.

Greenish or yellowish, thoracic stripes brown, abdomen olive green, frontal tubercles present, L.R. about 1.5, combs large, occupying half circumference of tibia, unarmed but separated, pulvilli absent, anal point broad and without row of dots, appendage 2 short and with simple hairs, whole hypopygium rather broad.

The formation of the tibial combs makes this species difficult to place in the known genera; it is precluded from *Micropsectra* and *Lundströmia* because the combs are clearly separated and from *Phaenopelma* because pulvilli are absent. It is probably best placed in the group of *Tanytarsus* to which Edwards (1929) refers as Group A. In this group the tibial spurs are very short and it can, in some ways be regarded as intermediate between the genera *Tanytarsus*, *Micropsectra* and *Lundströmia*.

*Male.* Wing length 1.8–2.4 mm.

*Head*, mouthparts and antennae dark brown, frontal tubercles well developed, A.R. about 1. *Thorax* yellowish, mesonotal stripes brown or occasionally reddish

brown, postnotum and sternopleuron darker brown. *Legs* brownish, pulvilli absent, L.R. about 1.5, combs of posterior legs large, occupying about one half of circumference, clearly separated but without spurs. *Wings* fairly well clothed with macrotrichia over most of the surface, costa and apex of  $R_{4+5}$  ending opposite apex of  $M_{3+4}$ , halteres yellow. *Abdomen* olive green, unmarked; hypopygium (Text-fig. 6, a) with broad anal point lacking row of dots, appendage 1 slightly drawn out at apex, appendage 1a narrow and projecting beyond 1, 2 with comparatively few hairs at apex, 2a short and stout with numerous simple hairs, styles rather blunt and short.

*Female* resembles male, antennae with six segments.

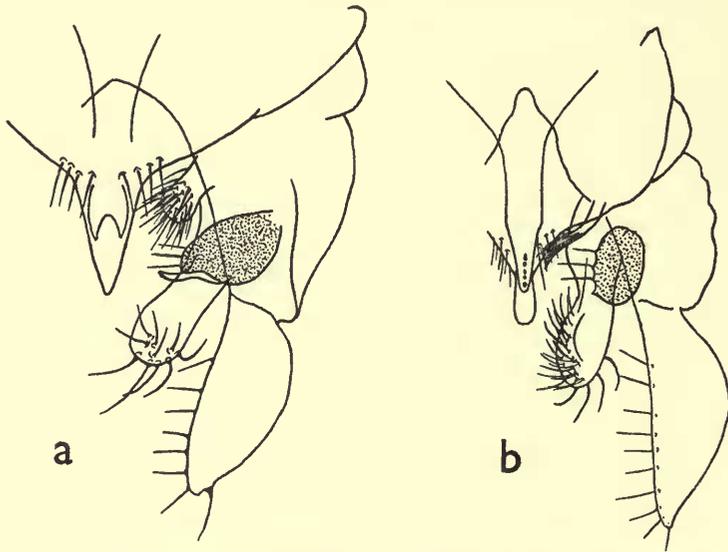


FIG. 6. Hypopygia of *Tanytarsus*. (a) *T. vespertinus*; (b) *T. funebris*.

I have seen cotype males in the British Museum and others from the Canterbury Museum (type locality, Christchurch).

DISTRIBUTION. CANTERBURY: Christchurch, cotypes and other specimens; Cass, 2 ♀, (*A. Tonnoir*); Rolleston, 1 ♂, xi.1922 (*J. W. Campbell*). OTAGO: Alexandra, 24 ♂, 12 ♀ (*C. C. Fenwick*).

### *Tanytarsus (Tanytarsus) funebris* sp. n.

A darker species than *vespertinus*, thoracic markings dark brown, abdomen a very dark olive or brownish green; tibial combs each with a strong spur; anal point of male with a row of dots, appendage 2a narrow and with a compact brush at apex. This species is much more typical than is *vespertinus* and is not unlike the African *T. nigrocinctus* Freeman, but is easily separated by the absence of markings on the abdomen.

*Male*. Wing length 2.5 mm.

*Head*, antennae and mouthparts dark brown, frontal tubercles present and well formed, A.R. about 1. *Thorax* mostly brown or dark brown, slightly pruinose; shoulders, lateral margins and scutellum yellowish, there is some indication of separation of the stripes. *Legs* yellowish brown, anterior tarsi broken, pulvilli absent, tibial combs separate and each with a strong spur. *Wings* with macrotrichia on apical half and as lines of hairs in cells in the more basal part; apex of  $R_{4+5}$  beyond level of apex of  $M_{3+4}$ . Halteres yellow. *Abdomen* uniformly very dark olive green or brownish green; hypopygium (Text-fig. 6, *b*) with row of dots on anal point, appendage 1 as shown or rather narrower, 1a absent, 2 with numerous hairs, 2a narrow with compact apical brush of hairs.

*Female* similar to male in colour, wings with denser and more evenly distributed macrotrichia.

Holotype male, South Canterbury, ii. 1923 (*T. R. Harris*). AUCKLAND: Paiaka, 1 ♂, 1 ♀, xi-xii. 1949 (*R. A. Cumber*). WESTLAND: Lake Moana, 1 ♂, 1 ♀, xii. 1925 (*A. Tonnoir*). CANTERBURY: New Brighton, Dyer's Road, 2 ♂, iv. 1922 (*J. W. Campbell*). Specimens collected by Tonnoir are in the Canterbury Museum, holotype and remainder are in the British Museum.

